THE IRON TRADE REVIEW

VOLUME XXXIX | CLEVELAND, JULY 12, 1906 | NUMBER 28

HEAVIER TONNAGE

THAN LAST YEAR IN MILLS OF PITTSBURG DISTRICT.

Scarcity of Labor Annoying.—Pig Iron Market Firm—Railroads Ordering More Rails for this Year.

The scarcity of labor is becoming an increasingly important factor in manufacturing centers. In the south where the supply had for some time been fairly short of the demand, the number of laborers has been considerably reduced on account of migration to the wheat fields of the west. In the coke region many laborers who were able to find employment in places where the temperature was not so high as about the coke ovens have done so, and the output of coke has been reduced on account of the inadequate number of laborers. An effort to determine the business on hand in the mills in the Pittsburg district indicates that they now have orders for a tonnage from 15 to 25 per cent in excess of that of the same time last year.

Pig Iron Market Firm. The week has been one of quiet firmness in the pig iron market. Following the recent heavy sales of southern iron at low prices, little business is being done by southern interests, and the usual quotation is $13.50 Birmingham for No. 2, although some orders have been taken as low as $13. In the valley seven furnaces will soon be out for repairs. There is a marked scarcity of Bessemer and basic grades. Bessemer is being shipped to the plant of the Algoma Steel Co., Sault Ste. Marie, Ont., on account of that company not being able to make enough pig iron to meet its own requirements.

New Seller of Billets. There is still a shortage of billets, but in the Chicago district relief will be furnished by the Illinois Steel Co., which, having completed its open-hearth extensions, will be a seller of billets. Forging billets are already easier in that market. The market for iron and steel bars is in a satisfactory condition. Although the demand varies in different districts, reports indicate that specifications are heavy where new business is not. Prices are firm with little likelihood of being changed.

Signing the Wage Scale. The leading independent manufacturers of sheets have signed the Amalgamated scale, and others are expected to do so shortly. One large plant has resumed after an idleness of five weeks, and it is expected that the mills will be run as fully as the supply of sheet bars will permit. Similar conditions prevail at tin plate mills.

More Rails Are Needed. An encouraging feature of the rail market is the placing of additional orders for 1906 by a number of railroads, this showing that the requirements for the present year had been underestimated. During the past two weeks, about 60,000 tons of standard sections have been sold through St. Louis representatives. Many railroads are inquiring for track supplies for next year. Light rails have advanced 50 cents per ton.

New Record is Made. The American Bridge Co.'s sales for the past six months are 50,000 tons more than any half year in its existence. Independent interests are understood to enjoy similar prosperity. Railroads are buying freely for bridge construction. Among orders recently placed was one for 4,000 tons for an addition to an eastern rolling mill.

New Sellers Very Busy. Wire mills are exceedingly busy, and it is expected that some additional capacity will soon be placed in operation in order to provide for the heavy fall trade. Coke prices are firm, and the output reduced. Quotations are slightly higher.

PASSAIC STEEL CO. AFFAIRS.

(Special Telegram.)

New York, July 11.—At a stormy adjourned special meeting of bond holders and stockholders of the Passaic Steel Co., in Paterson yesterday it was decided to ask the holders of $2,500,000 first mortgage bonds to surrender the bonds to a special committee and accept preferred stock of the same face value instead. They will be given until July 23 to file bonds. The new stock is to draw five per cent dividend. It will increase the stock outstanding to $8,000,000. The proposal was drafted by James Trontwein, Carbondale, Pa. The minority plan to place affairs in the hands of some trust company failed to carry. The company is handicapped by lack of credit, as it cannot get raw material or freight. Only 170 men are working of a total force of 1,500. If this plan fail, receivership is likely to follow.

Late rail sales are announced as follows: For 1907 delivery, Grand Trunk, 5,300; St. Joseph & Grand Island, 1,570; for 1906, Central R. R. N. J., 2,000; Wabash, 1,000 additional; Lafayette & Logansport Traction, 4,120. A heavy tonnage is pending for this year and next.

New Castings Company.—The Globe Malleable Iron Co. has been organized at Syracuse, N. Y., by Alexander T. Brown, president of the Franklin Mfg. and the Brown-Lipe Gear Companies; Willard Lipe, vice president of these two interests, Joseph S. Pickell and Sidney J. Marshall, with a capitalization of $50,000. The plant built by the Hyle Steel Tool Co., which went into bankruptcy, has been purchased and will be put in shape for the manufacture of malleable iron castings.

Southern Coal Deal.—The Gulf Coal & Coke Co., of Mobile, Ala., has sold to J. P. Hanson, president of the Georgia Central railroad, and his associates, 17,000 acres of coal lands in Walker and Jefferson counties, Ala.

William Hendrie Sr., of Hamilton, Ont., died June 27, aged 75. He was a prominent capitalist, connected with many financial and industrial enterprises, being president of the Hamilton Bridge Works Co.

THE WEEK IN IRON CENTERS.

PITTSBURG.

Increased Tonnage on Books.—Railroads Buying More Rails for 1906.

OFFICE OF *The Iron Trade Review*,
521 PARK BUILDING, July 11.

While the market has been comparatively quiet during the week under review, there has been no indication of weakness in either pig iron, steel, or finished material, all holding firm at former prices. Bessemer pig iron and semi-finished steel are both very scarce. A large percentage of the mills shut down for the annual repairs last week, some for only a few days, some for the whole week, and still others will remain idle during the greater part of the present week. It was thought that the scarcity of billets and sheet bars would be even greater than it has been for the past three months on account of this idleness, but it has developed that the matter will balance itself, as nearly a proportionate number of finishing mills closed, so that in the end there will be little change in this situation.

An effort has been made to get comparative statements from some of the large mills, showing the tonnages actually on the books July 1 this year and at the same period last year. While no accurate figures can be obtained, it is estimated that there is at the present time from 15 to 25 per cent more business on the books now than there was at the beginning of the second half of last year.

Several large rail inquiries are now being figured on for 1907 delivery and in this particular line the most encouraging feature is that many of the large roads are placing additional contracts for rails to be delivered this year, in excess of what they figured their requirements would be at the time previous contracts were placed.

The new No. 4 open-hearth department of the Carnegie Steel Co. at the Homestead plant was practically completed on Monday of this week, the first heat being poured in exactly 174 days after the first drawings of the improvement were made. The monthly capacity will be 35,000 tons. With the constantly growing demand for open-hearth steel, this plant became a necessity and was rushed to completion in record time. The previous record for quick construction in the Pittsburg district was in the erection of the No. 14 structural mill of the Jones & Laughlin Steel Co., when finished shapes were made in a few days over six months from the time first drawings were made.

Pig Iron.—While no pig iron transactions of large tonnages have been put through during the past week, market conditions are very strong and prices are firm. The Westinghouse Air Brake Co. bought 1,000 tons of northern foundry and there are a half dozen fair sized inquiries now in the market. Northern foundry is quoted $16.50, valley; Bessemer at $17.75, basic $17 to $17.25 and forge iron at $16.35, Pittsburg. Seven valley furnaces are either out at the present time or will be blown out within a short time for repairs. This number includes Cherry Valley and Middlesex, Claire, Youngstown Steel & Iron Co., South Sharon, Girard and Mable. Of these Mable, Girard, Youngstown Steel and Claire have been on Bessemer, South Sharon on basic and Cherry Valley and Middlesex on foundry and Bessemer.

While no accurate figures can be secured on output and stocks at valley furnaces for the six months ending June 30, it is a well known fact that there is but very little foundry iron and practically no Bessemer iron held in stocks at the furnaces, the conditions being that many of the furnaces are really behind on their deliveries and one instance may be cited where a furnace at the present time is making deliveries on iron that should have been shipped in May.

Bessemer Valley	17.75
Bessemer, Pittsburg	18.60
No. 1 Foundry, Pittsburg	17.60 to 17.85
No. 2 Foundry, Pittsburg	17.35 to 17.50
Gray Forge, Pittsburg	16.35
Basic, Valley	17.00 to 17.25
Basic, Pittsburg	17.85 to 18.10

Ferro - Manganese. — For prompt shipment ferro-manganese, foreign 80 per cent, is firmly held at $90, delivered Pittsburg, and even at this price business is being taken only subject to confirmation. The scarcity of this product has increased during the past month or six weeks and during that time the price has advanced $20 per ton above the low mark reached on the downward course started three months ago.

Steel.—Bessemer and open-hearth billets and sheet bars continue to be very scarce, with the leading producers practically out of the market. Conditions have become worse instead of better and at the beginning of the third quarter the leading producer encouraged some of his customers to buy elsewhere, if this was possible, in order to relieve the situation. There are cases where specifications against sheet bar contracts calling for May and early June delivery, are just being filled. Bessemer billets are quoted $27.50 and open-hearth at an advance of $1. Sheet bars are quoted $29.

Skelp.—There has been practically no inquiry and we continue to quote as follows on light guages and narrow widths:

Bessemer grooved, 1.57½c to 1.60c; sheared, 1.65c to 1.70c; basic grooved, 1.60c to 1.65c; sheared, 1.65c to 1.70c; iron skelp, grooved, 1.65c to 1.70c; sheared, 1.80c to 1.85c.

Sheets.—With the resumption of business after the July 4 holiday, when most of the independent mills were closed down for repairs, there was no trouble with the Amalgamated Association over the wage scale, the largest independent producers signing the schedule agreed upon between the Amalgamated and the leading interest. Business is in such prosperous shape that a shut-down on account of labor trouble was not considered advisable at this time when manufacturers have large tonnages on their books and consumers are urging delivery. The American Sheet & Tin Plate Co. on Monday of this week started one of its largest mills which had been down for five weeks. We quote:

Black steel sheets, box annealed, cold rolled, one pass Nos. 11-12, 2.10c; Nos. 13-14, 2.15c; Nos. 15-16, 2.20c; Nos. 17-21, 2.25c; Nos. 22-24, 2.30c; Nos. 25-26, 2.35c; No. 27, 2.40c; No. 28, 2.50c; No. 29, 2.65c; No. 30, 2.75c. Galvanized No. 10-11, 2.45c; Nos. 12-14, 2.55c; Nos. 15-16, 2.65c; Nos. 17-21, 2.80c; Nos. 22-24, 2.95c; Nos. 25-26, 3.15c: No. 27, 3.35c; No. 28, 3.55c; No. 29, 3.80c; No. 30, 4.05c. Corrugated roofing, $1.75 per square for No. 28 painted, 2½-inch corrugation; $3.10 per square for No. 28 galvanized, 2½-inch corrugation. Quotations f. o. b. Pittsburg on large lots.

Plates.—Plate mills are in good shape and while they could easily handle more business, there is enough on hand at the present time to insure continued operation throughout the summer. The demand for sheared plates is particularly heavy. The steel car companies have taken on some business during the past week and are still in shape to assume further delivery obligations for 1906, reports to the contrary notwithstanding. We quote as follows:

Tank plate ¼ inch thick, 6¼ to 100 inches, 1.60c f. o. b. mill, Pittsburg. Extras are as follows per 100 pounds, boiler and flange steel plates, 0.10c; A. B. M. A. and ordinary firebox steel plates, 0.20c; still bottom steel, 0.30c; marine steel, 0.40c; locomotive firebox steel, 0.50c; all sketches excepting straight taper plates, varying not more than four inches, in width at ends, narrowest end not being less than 30 inches, 0.10c; complete circles, 0.20c. Plates in width over 100 inches up to 110 inches, 0.05c; over 110 inches up to 115 inches, 0.10c; over 115 inches up to 120 inches, 0.15c; over 120 inches up to 125

inches, 0.25c; over 125 inches up to 130 inches, 0.50c; over 130 inches, 1.00c. Gauges under ¼ inch to and including 3-16 inch plates on thin edges, 0.10c; under 3-16 inch to and including No. 8, 0.15c; under No. 8 and including No. 9, 0.25c. Five cents extra for less than carloads. Terms net cash in 30 days.

Hoops and Bands.—With the arrival of the contract period there has been considerable new business placed for the year beginning July 1, while those buyers who buy from September to September will delay another two months. The business placed has not been particularly heavy on individual contracts, but the aggregate has been good and well distributed. Hoops for cooperage purposes have been moving freely. Prices are unchanged and we quote as follows:

Hoops, 1.90c in carload lots, and 2c on less than carload lots; bands, 1.50c base, half extras as per standard steel card. Prices f. o. b. Pittsburg.

Muck Bar.—In the absence of any actual new business and with but very little inquiry and practically no muck bar offered, we quote a nominal market at $29.

Rails and Track Material.—While no large tonnages for next year have been absolutely closed by local mills, several heavy inquiries are being figured upon. Roads now negotiating for rails for 1907 delivery include Lehigh Valley and the Southern. The strong point in the situation is the fact that trunk lines continue to place additional tonnages to existing contracts for this year delivery, roads in this position being the Lehigh Valley and the Baltimore & Ohio. The Erie is at present negotiating for 16,000 tons for 1906 delivery and it may safely be said that mills will have before the end of the month business on their books up to the full theoretical capacity. Light rails are in strong demand and both iron and steel spikes are hard to obtain for delivery before Sept. 1. We quote:

Fifty pounds and heavier, 500-ton lots and over, $28; carloads and less than 500 tons, $30; less than carload lots, $32; light rails, 16 pounds, $30; 20 pounds, $28.50; 25 to 45 pounds, $28.50; angle bars for standard sections, 1.50c; spikes, $2.05 to $2.10.

Structural Material. — The demand for structural material continues good and a large amount of business has been placed and still more is in sight for the immediate future. During the week a contract for 4,000 tons for additions to an eastern rolling mill was placed and bids were opened for material amounting to about 2,000 tons for two additional buildings for the Carnegie Technical Schools. Mills are being pressed for delivery on heavy sections. We quote prices unchanged as follows:

Beams and channels, 15 in., and under, 1.70c; over 15 in., 1.80c; zees, 1.70c; tees, 1.75c; angles from three to six inches, inclusive, 1.70c; over six inches, 1.80c; universal and sheared plates, 6¼ inches and wider, 1.60c base.

Tin Plate.—There will probably be no change in this list of union and non-union mills for the coming year, the leading interest having signed the Amalgamated scale and independent interests as soon as they are ready to resume will do the same. We quote $3.75 per base box, f. o. b. Pittsburg, 14 x 20 100-pound cokes, terms 30 days, less two per cent off for cash in ten days.

Merchant Pipe.—As has been the case for several months past, the new tonnage has been good, but prices are low, which fact is being taken advantage of by the buyers, while mills are not particularly anxious to fill up for any long period ahead. There has been considerable talk of line pipe inquiries about ready to come out, but they have not materialized. The extreme discount in large lots is 81 per cent and 5 off. On pipe we quote the official prices as follows on consumers' carload lots, jobbers' carloads one point higher discount:

	Steel		Iron	
Consumer's Carloads	Black	Galv.	Black	Galv.
⅛ and ¼ inch	71	55	67½	51½
⅜ inch	73	59	69½	55½
½ inch	75	63	71½	59½
¾ to 6 inches	79	69	76	66
7 to 12 inches	74	59	71	55½
EXTRA STRONG PLAIN ENDS.				
⅛ to ⅜ inch	64	52	60½	48½
½ to 4 inches	71	59	67½	55½
4½ to 8 inches	67	55	63½	51½
Double extra strong plain ends, ⅛ to 8 inches	60	49	56½	45½

Boiler Tubes. — Conditions in this line have not changed and new business is running along in seasonable volume without features or variation. We quote:

	Steel	Iron
1 to 1½ inches	50	45
1¾ to 2¼ inches	62	45
2½ inches	64	50
2¾ to 5 inches	70	57
6 to 13 inches	62	45

Less than carload lots two points less.
2½ inches and smaller, over 18 feet, 10 per cent net extra.
2¾ inches and larger, over 22 feet, 10 per cent net extra.

Merchant Bars.—With the exception of two lots of 1,000 tons there has been nothing out of the ordinary in the iron bar market, save that prices are being maintained and there has been some business being placed right along. We continue to quote:

Common iron bars, 1.55c, Pittsburg, in carload lots, 1.60c in less than carloads; for western shipment 1.50c base Pittsburg; Bessemer steel bars, 1.50c; plow and cultivator, 1.50c net; channels, angles, zees and tees, under three inches, 1.60c, all f. o. b. Pittsburg. The following differentials are maintained on steel: Less than 2,000 pounds, 0.10c advance; less than 1,000 pounds, of a size, 0.30c advance.

Steel Bars.—Apparently realizing the futility of awaiting a lower market, buyers have placed in the aggregate a good round tonnage during the week under review. This business has not been bunched nor has it been large as far as individual contracts have been concerned, but the fact that the buying is more general, is taken as a god indication. We quote:

Cold rolled and ground shafting, 50 per cent off in carload lots, and 45 off in less than carloads, delivered in base territory; tire steel, 1.70c to 1.80c; open-hearth spring steel, 2.25c to 2.50c; sleigh shoe flat, 1.50c to 1.55c; smooth finished machinery steel, 1.90c to 2c; toe calk, 2.05c to 2.10c. The price of planished and machine straightened tire is 1.70c base half extras as below. Iron finished tire up to 1½ inch by ½ inch, 1.65c base half extra tire list. Iron finished tire up to 1½ inch by ½ inch and over to be sold on regular bar basis of 1.50c base; half extra steel card.

Wire and Wire Nails.—Already contracts have been placed with the mills for considerable business to run over the last half of the year and the unusual feature of the situation is the strength shown at this time of the year, there having been no changes in prices and in some instances mills have scarcely caught up with their contracts. The summer shut-down will be only long enough to permit the annual repairs to be made. Wire nails, smooth fence and barb wire are in very strong demand. We quote:

Wire nails, jobbers' carload lots, $1.85; retailers' carload lots, $1.90, and less than carload lots, $2; painted barb wire, $2 for jobbers in carloads; retailers in carloads, $2.05, and less than carloads, $2.15, with 30c for galvanizing; plain wire, $1.70 to jobbers and $1.75 by carload.

Coke.—The scarcity of labor in the coke region has been a serious problem for about six weeks and it is expected this week so show itself in the production. During the hot weather the laborers have gone out on railroad construction and with new coke propositions under course of erection and have left the hot work at the ovens. Coke has held its own and prices are firm at $2.50 to $2.60 for furnace coke and $2.85 to $2.95 for foundry. While there is plenty of high sulphur and medium coke, the strictly Connellsville higher grades are scarce, particularly for spot delivery.

Old Material.—There has been no change in prices and conditions remain practically the same as they have been for the past month, with the exception that there is an expectation that on account of the new open-hearth plant of the steel corporation starting at Homestead, the corporation will be in the market

for some large tonnages. It has been reported that a large tonnage of low phosphorus crop ends has been sold, but this could not be verified in time for this report. The two large steady buyers in this district have not been in the market for some time and are expected before long. We quote, gross tons, delivered:

Heavy melting stock, $15.50 to $16; No. 1 cast scrap, $15 to $15.50; cast borings, $8.50 to $9; bundled sheet scrap, $13.50; malleable scrap, $15.50; No. 1 railroad wrought, $17; low phosphorus scrap, $18 to $18.50; wrought turnings, $11 to $11.50; busheling scrap, $14 to $14.50; iron axles, $25.50 to $26; old rails rerollers, $17.50.

The Shenango Furnace Co., of Sharpsville, Pa., is making surveys for a new blast furnace to be located between the present Nos. 2 and 3 at the Sharpsville plant. Details of construction have not been completed. This will give the company five modern furnaces.

CHICAGO.

Pig Iron Market Strong.—Scarcity of Billets is Relieved.

Office of *The Iron Trade Review*, 1562 Monadnock Block, July 9.

In the period that has elapsed since the abrogation of the southern agreement, pig iron has developed unusual strength. Following the advance in southern irons to the basis of $13.50, northern furnaces have set their minimum at $18.50 Chicago. Demand is waning, a fact which producers view with favor, believing that higher prices will be realized in the fall than can be obtained at present. New tonnage in finished materials is of nominal proportions, though specifications continue extremely heavy. Early deliveries are hard to obtain, mills being sold far ahead on almost every form of rolled iron and steel. The billet famine has been relieved to some extent by the advent into the market of the Illinois Steel Co., after an absence of several months. This interest has completed all its open-hearth extensions at South Chicago and now has some surplus capacity to sell. The only price changes this week are in light rails and boat spikes, the former being advanced 50 cents a ton, and the latter $2 a ton. The Western Bar Iron Association met again yesterday and reaffirmed prices on that product. All other quotations are firmly maintained. Track supplies are in active demand, railroads contracting heavily for next year's requirements. Cast iron pipe is also experiencing a good demand for this period of the year, among the inquiries being one from Chicago for 8,400 tons.

Pig Iron.—Strength is the dominant note of the market today. Standard grades of southern irons are firmly established on the basis of $13.50 and northern brands at $18.50 Chicago. Only a few southern furnaces are quoting $13.25 or thereabouts, and these prices are invariably on irons not favorably known. All the lake furnaces are holding for $18.50, which represents an advance of 25 cents to 50 cents a ton above the quotations of ten days ago. Virginia furnaces, which reduced their prices $1 a ton last week, have re-established the $16 schedule, and will consider nothing below that price. Many furnaces are indifferent to further tonnage, some having fully sold up and a majority of the remainder having from one-half to three-quarters of their capacity placed. Substantially 250,000 tons of southern iron changed hands during the buying movement in June, one-half of which was taken by the Tennessee-Republic interests. Stocks on southern yards are very low, a recent compilation showing not more than 63,000 tons in the entire south, including warrant irons. There is not half this tonnage in storage at western lake furnaces. These revelations have materially strengthened the market, and while trading is quiet just now, sellers are confident the danger line has passed. Current demand is mostly for small lots, the largest inquiry of the week being for 5,000 tons of basic from a local consumer. Alabama iron producers have made application again to the railroads to take off the 25 cents per ton which was added to freight rates March 1, and there is strong hope that the request will be granted. We have revised our prices, and quote as follows:

Lake Superior charcoal	$19.00
Northern Foundry No. 1	18.75 to 19.00
Northern Foundry No. 2	18.25 to 18.50
Northern Foundry No. 3	17.75 to 18.00
Northern Scotch Foundry	18.75
Ohio Strong Softeners No. 1	18.80
Ohio Strong Softeners No. 2	18.30
Southern Foundry No. 1	17.65 to 17.90
Southern Foundry No. 2	17.15 to 17.40
Southern Foundry No. 3	16.65 to 16.90
Southern Foundry No. 4	16.15 to 16.40
Southern No. 1 Soft	17.65 to 17.90
Southern No. 2 Soft	17.15 to 17.40
Southern Gray Forge	15.40 to 15.65
Southern Mottled	15.15 to 15.40
Southern Silveries (4 percent to 6 percent Silicon)	17.90 to 18.40
Jackson Co. Silveries, 8 to 10 percent Silicon	23.30
Alabama and Georgia Car Wheel	23.90 to 24.40
Malleable Bessemer	18.25 to 18.50
Standard Bessemer	19.30
Basic Iron	18.85

Billets.—The shortage in billets that has been so conspicuous a feature of this market for the past year is in a fair way to be overcome. The Illinois Steel Co. has completed its open-hearth extensions commenced a year ago and with its fourteen new furnaces in operation has some surplus billet capacity to offer. This relief comes at an opportune time, for forging and rerolling billets have been extremely scarce for several months. The congestion in rods and sheet bars continues of an acute nature, deliveries of either being hard to obtain. Forging billets are easier with the advent in the market of the Illinois Steel Co., which is quoting $35 Chicago. Wire rods remain at $33 Pittsburg, and sheet bars $29 Pittsburg.

Iron and Steel Bars.—New tonnage in these products has fallen off in the past ten days. This slack is more than offset, however, by voluminous specifications. Implement manufacturers are taking all the material they can get, frequently specifying in lots of 2,000 to 3,000 tons. One or two bar iron mills in this district continue idle, but all will be in operation again before the end of this week. The Western Bar Iron Association met recently and reaffirmed present prices. We quote carload lots, mill shipments, Chicago delivery, as follows:

Bar iron, 1.66½c; soft steel bars and bands, 1.66½c, half extras; soft steel angles, less than 3 x 3, 1.76½c; hoops, 2.06½c base, full extras; old rail stock, 1.65½c. Jobbers report a good demand from stock, with prices firm. We quote bar iron, 2.10c, full extras; soft steel rounds and squares, 3 inches and larger, $2 per 100 pounds base; flats, 2 inches to 4 inches by 1⅛ inch and larger, $2 per 100 pounds base; flats, 2 inches to 4 inches by 1⅛ inch and larger, $2 per 100 pounds base; flats, 4½ inches x 5 inches and 6 inches x 5-16 inch and thicker, $2 per 100 pounds base; all ovals, half rounds, $2 per 100 pounds base; steel bands, $1.85 to $1.95 half extras; soft steel hoops, $2.30 to $2.40 full extras. Other sizes not mentioned above, $1.85 per 100 pounds base, plus half extras.

Sheets.—No cessation is noted in the demand for black and galvanized sheets. Mills are crowded with specifications and are adding new business for deliveries extending through the year at a rate that foretells trouble when wintry conditions commence breaking freight schedules. Prices are without change, mill shipments, Chicago delivery, being quoted as follows:

Nos. 8, 9 and 10, 1.96½c; Nos. 11 and 12, 2.01½c; Nos. 13 and 14, 2.06½c; Nos. 15 and 16, 2.16½c; box annealed; Nos. 18 and 20, 2.36½c; Nos. 22 and 24, 2.46½c; No. 26, 2.51½c; No. 27, 2.56½c; No. 28, 2.66½c; No. 29, 2.81½c; No. 30, 2.91½c. Jobbers' prices on less than carload lots from store are as follows: No. 10, 2.20c; No. 12, 2.25c;

No. 14, 2.30c; No. 16, 2.40c; Nos. 18 and 20, 2.65c; Nos. 22 and 24, 2.70c; No. 26, 2.75c; No. 27, 2.80c; No. 28 2.85c; No. 30, 3.30c.

Galvanized sheets, mill shipments, are as follows: Nos. 10 and 11, 2.56½c to 2.61½c; Nos. 17 and 21, 2.91½c to 2.96½c; Nos. 22 and 24, 3.06½c to 3.11½c; Nos. 25 and 26, 3.26½c to 3.31½c; No. 27, 3.46½c to 3.51½c; No. 28, 3.71½c to 3.76½c; No. 29, 3.91½c to 3.96½c; No. 30, 4.16½c to 4.21½c. From store, prices on less than carload lots are as follows: Nos. 10 to 20, 3.10c to 3.20c; Nos. 22 and 24, 3.25c to 3.35c; No. 26, 3.45c to 3.55c; No. 27, 3.65c to 3.75c; No. 28, 3.85c to 3.95c; No. 30, 5.05c to 5.15c.

Plates.—Specifications for sheared and universal plates are quite active. New tonnage is also of good proportions. Demand from store is brisk, jobbers finding it difficult to keep on hand a complete line of sizes. Prices are without change, mill shipments, Chicago delivery, being as follows:

Tank steel, ¼-inch and heavier, up to 100 inches wide, 1.76½c base; flange steel, 1.86½c base; marine steel, 1.96½c base; all full extras. Plates 3-16 inch thick, $2 extra; gauges, 7 to 8, $3 extra; No. 9, $5 extra. Less than carload lots, $5 extra. We quote from local stocks; tank steel ¼ inch and heavier, up to 72 inches wide, 2c to 2.10c; 72 inches to 96 inches wide, 2.10c to 2.20c; 3-16 inch up to and including 60 inches wide, 2.10c to 2.20c; 3-16 inch 72 inches wide, 2.35c to 2.45c; No. 8, up to 60 inches wide, 2.15c to 2.25c; flange steel, 25c extra; heads, 25c extra.

Structural Steel.—Railroads are the most active today in the demand for structural shapes. Contracts recently placed with the American Bridge Co. include 1,000 tons from the Northern Pacific; 1,100 tons from the B. & O.; 1,500 tons from the Pennsylvania; 400 tons from the Lake Shore & Michigan Southern, and 400 tons from the St. Paul. This company also expects soon to get the contract for the erection of the billet and rail mills at Gary, Ind., for which about 20,000 tons of shapes will be required. In the local field the only new building on which figures are being taken, is the 14-story structure to be erected for the International Harvester Co., which will require about 1,500 tons. The South Chicago structural mill is running easy, and prompt specifications can now secure early deliveries. Prices are without change, mill shipments, Chicago delivery, being quoted as follows:

Beams and channels, 3 to 15 inches, inclusive, 1.86½c; angles, 3 to 6 inches, 1.86½c; angles, larger than 6 inches, on one or both legs, 1.96½c; beams, larger than 15 inches, 1.96½c; zees, 3 inches and over, 1.86½c; tees, 3 inches and over, 1.91½c, with the usual extras for cutting to exact lengths, punching, coping, bending, etc.

Quotations on lots from store are as follows: All angles three inches and larger, including six inches, $2.25 per 100 pounds base; angles over six inches, $2.35 per 100 pounds base; tees, three inches and larger, $2.30 per 100 pounds base; beams, three inches to fifteen inches, inclusive, $2.25 per 100 pounds base; beams, eighteen inches and larger, $2.35 per 100 pounds base; channels, three inches and larger, $2.25 per 100 pounds base.

Rails and Track Supplies.—All the western roads are making inquiries on their requirements for next year in track supplies. The tonnage for that year is expected to exceed that of any previous year. Demand for light rails continues unusually good, the best delivery obtainable from the local maker being October or November. No slackening is noticed in the volume or orders for standard sections, about 11,000 tons having been transferred to the Carnegie Steel Co. by the local mill in the week under review. Prices are very strong, light rails having been advanced 50 cents a ton. We quote standard sections f. o. b. mill, open-hearth rails, $29; Bessemer, $28; light rails, Bessemer steel, 30 to 45-pound sections, $28.50; 25-pound, $29.50; 20-pound, $30.50; 16-pound, $31.50; 12-pound, $32.50, and lighter sections down to eight pounds, $29.50 to $41.50, all f. o. b. mill. Track supplies are quoted as follows: Angle bars, 1.50c to 1.75c; spikes (for quick shipment), 2.15c to 2.25c; for forward deliveries, 2c; track bolts (for quick shipment), 2.65c to 2.75c base; square nuts (for forward deliveries), 2.50c.

Merchant Steel.—Practically the entire agricultural trade in the west has covered for its requirements in the ensuing year. Specifications are the order of the day, and these are to full contract requirements. We quote mill prices, Chicago delivery, as follows:

Planished or smooth finished tire steel, 1.86½c; iron finish, up to 1½ x ½ inch, 1.81½c; iron finish, 1½ x 1½ inch and larger, 1.66½c, base; channels for solid rubber tires, ¾ to 1 inch, 2.16½c, and 1⅛ inch and larger, 2.06½c; smooth finished machinery steel, 1.91½c; flat sleigh shoe, 1.71½c; concave and convex sleigh shoe, 1.96½c; cutter shoe, 2.35c; toe calk steel, 2.21⅛c; railway spring, 1.86½c; crucible tool steel, 6½c to 8c, and still higher prices are asked on special grades. Shafting, 50 per cent off in car lots and 45 per cent in less than car lots, in base territory.

Cast Iron Pipe.—This being the dull season for the cast iron pipe trade, new business is naturally slow. The only municipal contract of importance on which figures are being taken is that of the city of Chicago, which is in the market for 8,400 tons. Prices continue firm, as follows: Four-inch water pipe, $32.50; six and eight-inch pipe, $31; 10-inch and larger, $30; gas pipe, $1 extra.

Boiler Tubes.—Trade is good and the outlook from a manufacturers' standpoint is bright. Mill prices are firm, but some shading is observed in the competition between jobbing interests. We quote as follows:

	Steel	Iron	Seamless
1 to 1¼ inches	40.35	43.35	53.35
1¼ to 2¼ inches	58.35	43.35	40.35
2½ inches	60.35	48.35	43.35
2¾ to 5 inches	68.35	55.35	
2¾ to 4½ inches (Seamless)			50.85
6 to 13 inches	58.35	43.35	

Less than carload lots, from store, as follows:

	Steel	Iron	Seamless Steel
1 to 1¼ inches inclusive	40	35	42½
1⅜ to 2¼ inches, inclusive	50	35	35
2½ inches, inclusive	52½	35	50
2¾ to 5 inches, inclusive	60	47½	42½

Merchant Pipe.—No change is noted in the general situation. Weather and other conditions taken into consideration, the market is in good shape. Demand is fair, specifications are active, and prices firm. We quote on the base sizes ¾ to 6-inch black steel pipe, 79.35 per cent discount Chicago, and 69.35 Chicago for galvanized pipe. Local jobbers continue to ask 76 and 77 per cent discount on the base sizes ¾ to 6-inch black steel pipe.

Wire Products.—Not having yet accumulated any stocks for the fall trade, the leading interest is contemplating putting in operation at once the two mills that are idle for repairs. The demand for all forms of wire products, but especially smooth wire, is as insistent as ever, and it is impossible for manufacturers to keep pace with the requirements of their customers. Stocks in dealers' and retailers' hands are very low, and with fall so near at hand many are becoming anxious on the delivery question. Prices are firm in this city, despite the reports that are frequently heard that they are being shaded. We quote Chicago delivery, as follows:

Wire nails, $2; painted barbed wire, $2.15; galvanized barbed wire, $2.45; smooth annealed wire, $1.85; smooth galvanized wire, $2.15; polished staples, $2.15; galvanized staples, $2.40. Carload lots to retailers, 5 cents higher than above prices; less than carload lots, 15 cents higher.

Coke.—There is a liberal demand for coke, and furnaces and foundries are covering freely for requirements in the next twelve months. Standard 72-hour Connellsville grades are quoted at $2.85 ovens or $5.50 Chicago, on which basis

by-product is also being sold in this market. Virginia and West Virginia grades are from 50 cents to 75 cents a ton lower.

Old Material.—No improvement is noted in the local market. Demand is light and prices are soft. Western consumers generally are well covered for some months ahead, especially bar iron mills and open-hearth plants, and attractive prices are required to interest these consumers. Railroad offerings are heavy, the two most important lists being those of the Santa Fe for 3,200 tons, and the B. & O. for about 1,500 tons. We quote as follows, gross tons being mentioned in the first paragraph:

Old Steel Rails (4 feet and over)	$15.50 to 16 00
Old Steel Rails (less than 4 feet)	14.00 to 14.50
Old Car Wheels	18.00 to 18.25
Old Iron Rails	20.50 to 21.00
Relaying Rails, subject to inspection	27.00 to 27 50
Heavy Melting Steel	13.00 to 13.50
Mixed Country Steel	11.00 to 11.50

We quote net tons, as follows:

No. 1 R. R. Wrought	$13.25 to 13.50
No. 2 R. R. Wrought	12.25 to 12.50
Shafting	15.75 to 16.00
Dealers' Forge No. 1	11.25 to 11.50
Wrought Pipe and Flues	9.25 to 9.50
No. 1 Cast, 150 pounds and less	13.00 to 13.50
No. 1 Mill	8.25 to 8.50
Mixed Busheling (No. 1 & No. 2)	8.50 to 9.00
Country Sheet	7.25 to 7.50
No. 1 Boilers Cut	9.25 to 9.50
Boiler Punchings	11.00 to 11.50
Iron Car Axles	22.50 to 23.00
Steel Car Axles	17.50 to 18.00
Iron Axle Turnings	9.25 to 9.50
Cast Borings	7.00 to 7.50
Mixed Borings, etc.	7.00 to 7.50
Machine Shop Turnings	8.75 to 9.00
Railroad Malleable	12.50 to 13.00
Agricultural Malleable	12.50 to 13.00
Stove Plate and Light Cast Scrap	10.50 to 11.00
Old Iron Splice Bars	16.00 to 16.50

NEW YORK.

In Pig Iron Mild Buying Movement Ends Comfortably for Both Producer and Consumer.

OFFICE OF *The Iron Trade Review*,
ROOM 1315, No. 150 NASSAU ST., July 9.

Pig Iron.—The mild buying movement inaugurated by the southern producers two weeks ago seems to have reached its limit immediately before the Fourth. At least business has been somewhat less brisk since the national holiday whatever may have been the cause. The present lull leaves both sides in a fairly comfortable state for the third quarter. Some of the larger consumers have not filled their requirements for that period, but as a whole the foundries are supplied until October and few of the furnaces have any iron to sell for earlier delivery. There has been some buying for the last quarter, but it is generally believed that that is the exception rather than the rule.

During the week there has been practically no business in local circles in steel irons. Nearly all the sales have involved moderate sized lots of foundry grades, mill and misfit pig. Sales of more than 1,000 tons have been rare, nearly all the purchases ranging between 100 and 500 tons each. The following sales are typical of the great many similar orders which made up the week's business: 500 tons, southern, No. 2; 150 tons Virginia, No. 2; 100 tons eastern Pennsylvania, No. 1; 400 tons northern foundry, and 1,000 tons of various grades taken by a New England malleable iron foundry; 1,500 tons of various analyses for a pump works.

Prices have stiffened perceptibly, many of the producers having again practically retired from the market. At the present moment no Birmingham No. 2 is to be had at less than $13.50 and northern grades are held on a higher basis than that. Last week some material in the south was offered on the $13, Birmingham, basis, but the quotations did not emanate from the Birmingham district.

The coke trade is fairly active, sales of foundry coke being considerable. Prices for foundry range from $2.70 to $3.10. One brand of by product coke made especially for foundry purposes is beginning to enjoy a respectable sale in this territory.

Ferro-manganese is again attracting attention, several lots in car load quantities having been sold during the week. The present price at tidewater is not far from $90 for moderate lots.

The following are prices of pig iron at tidewater.

Northern No. 1 Foundry	$18.25 to 19.00
No. 2 Foundry	17.75 to 18.55
No. 2 Plain	17.50 to 18.00
No. 1 Southern Foundry	17.50 to 18.00
No. 2 Southern Foundry	17.00 to 17.50
No. 3 Southern Foundry	16.15 to 17.00
No. 4 Foundry	15.50 to 16.00

Certificates and Warrants. — Warrants have been in better demand with, however, no results as far as actual business is concerned, although the effect upon prices appeared in a slight increase in firmness. On the whole the market continues extremely quiet with little or no change in the prices of certificates.

The following are today's quotations for standard foundry iron contracts:

Standard Foundry Contracts.

	Bid.	Asked.
July	17.25	
October	17.00	17.25
November	17.00	17.25

Finished Iron and Steel.—Although several large contracts for finished material continue to hang fire and the business from week to week seems to be confined to small lots, still the volume continues to break records. Business booked by the American Bridge Co. during the first half of the year reached a total of more than 50,000 tons above any previous half yearly record. It was also a record half year as far as shipments are concerned. The shops are now turning out work at the rate of nearly 700,000 tons per annum, and before the end of the summer it is predicted that the monthly output will equal 60,000 tons or 720,000 tons per year. The bookings for June, although there were no large orders, make a total of 60,000 tons, and it is understood that independent producers have enjoyed prosperity in proportion. A number of big office jobs in this city and elsewhere are still in suspense. In some cases buildings have been torn down and preparations for laying the foundations begun without the issue of specifications for the necessary steel.

The largest single order for steel recently placed came to the American Bridge Co. in the form of 25,000 tons for buildings to cover the open hearth furnaces at Gary, Ind. After the contract for the rail mill has been placed which will involve from 10,000 to 15,000 tons of material, the bulk of the 45,000 tons of steel thus far authorized by the U. S. Steel Corporation for that great plant will have been provided for. The contract for 14,000 tons of bridge work for the southern railroad also went to the American company, as did also an order for 3,000 tons of material for the Illinois Central. The Boston & Maine placed an order for 1,500 tons of bridge material with a New England builder and the Delaware & Hudson contracted for 250 tons for small bridges. There were many other bridge jobs, all small individually, but in the aggregate large.

The rail market has not shown its usual activity since the Fourth, but the normal number of sales may be expected to make an appearance before the present issue goes to press. Plate business is of a routine character, there being a steady though limited demand from the local ship yards. The ship builders have recently changed the manner of issuing specifications to their own advantage. Hitherto all specifications came into the offices of the plate men at once and the producers devoted their attention to the cream of the business first, with the result that the side plates lay about the yard while the vessel waited for keel material. Now specifications are issued only as the material is required. A ship yard in Newburg is gathering material for the construction of one or more tugs. The demand for bar iron has been very moderate and the market easy.

The following are prices at tidewater: Angles, 3 to 6 inches x ¼ inch and heavier, 1.84½c; beams, 3 to 15 inches, 1.84½c; tees, 3 x ¼ inch and heavier, 1.89½c; plates, carloads, tank, 1.74½c; flange, 1.84½c; marine boiler, 2.41½c; refined iron bars, 1.54½c to

1.64½c; soft steel bars, 1.64½c; sheets, No. 28 black, 2.50c.

Old Materials.—There has been little or no change in the market for scrap material. The movement of stock is light and there appears to be little disposition on either side to do business. Heavy melting steel scrap has probably had the most attention although the reports of sales all seem to come from Pittsburg. The demand for old rails in rerolling and relaying lengths is somewhat more active than the call for some other forms of scrap.

The following are prices approximately f. o. b. tidewater:

Old iron rails	$21.00 to 22.00
Old steel rails, long lengths	14.50 to 15.00
Old steel rails, short pieces	14.00
Relaying rails	24.00 to 25.00
Old car wheels	16.00 to 17.00
Old iron car axles	25.00 to 26.00
Old steel car axles	18.00 to 19.00
Heavy melting steel scrap	14.00 to 14.50
No. 1 railroad wrought scrap	16.00 to 16.50
Iron track scrap	14.50 to 15.00
Wrought pipe	12.50 to 13.50
Cast borings	9.50 to 10.00
Wrought turnings	13.00 to 13.50

The Bessemer plant of the Youngstown Sheet & Tube Co., will be in operation shortly after August 1. The new billet and bar mill and the two new converters are rapidly nearing completion.

CLEVELAND.

Pig Iron Market Less Active.—Scarcity of all Grades, Especially Bessemer.

OFFICE OF *The Iron Trade Review*,
BROWNING BUILDING, July 10.

Iron Ore.—Complete statistics of the ore movement from upper lake ports for the month of June and for the season to July 1 are available. These show that the shipments during June were 5,489,256 tons, an increase over June, 1905, of 9.8 per cent. This sets a new record for the ore movement during any one month in the history of lake navigation. By docks the shipments were as follows:

	June, 1905	Per cent of Total	June, 1906	Per cent of Total
Escanaba	781,280	15.63	814,664	14 84
Marquette	419,955	8.40	398,490	7.26
Ashland	549,493	10.99	556,701	10.14
Superior	730,435	14.61	885,588	16.13
Duluth	1,379,491	27 59	1,656,831	30.19
Two Harbors	1,138,796	22 78	1,176,982	21 24
	4,999,450	100.00	5,489,256	100.00

	To July 1, 1905	Per cent of Total	To July 1, 1906	Per cent of Total
Escanaba	1,737,372	16 07	1,738,408	15.46
Marquette	1,017,933	9 41	802,887	7.15
Ashland	1,122,251	10.38	1,188,763	10.57
Superior	1,634,403	15.11	1,753,775	15.60
Duluth	2,747,018	25.40	3,181,235	28.30
Two Harbors	2,555,077	23 63	2,566,576	22.92
	10,814,054	100.00	11,241,596	100.00

The movement during July starts with conditions entirely favorable, and another record-breaking month is certain. No ore sales are reported and prices are nominally on the basis of $4.25 old range Bessemer.

Pig Iron.—The growing scarcity of all grades of iron has resulted in a less active market in this district. No inquiries for large tonnages have developed, and the volume of business is small when compared with the extremely active selling of the past few weeks. Foundry iron is in increased scarcity and small melters, who have failed to cover for their immediate requirements, are finding it exceedingly difficult to keep their plants in operation. Under these circumstances the price is of small importance and an instance has come to light of $17.50 Cleveland furnace being refused, though $16.75 northern valley properly represents the present market. Without exception, furnace interests are sold up for several months ahead, and are not seeking business actively. They are shipping from make and are paring down specifications to take care of the consumers' immediate wants. Both basic and Bessemer are extremely scarce, and a sale of 1,000 tons of the former at a price well above $17 is noted. The extent of the Bessemer famine may be judged from the fact that a round tonnage is being shipped from Ironton, O., to the Soo. Southern prices have stiffened during the week and $13.50 furnace is now the minimum. Some good sales of coke have been closed recently, prices remaining at $2.50 for furnace and $2.75 for foundry at the oven. We quote, Cleveland delivery, as follows:

Bessemer	$18.10 to 18.35
No. 1 Foundry	17.25 to 17.75
No. 2 Foundry	17.00 to 17.50
No. 3 Foundry	16.50 to 16.75
No. 2 Southern	17.35 to 17.60
Gray Forge	16.35 to 16.85
Gray Forge, Southern	15.85 to 16.35
Lake Superior charcoal	19.50 to 20.00

Finished Materials.—An improved demand for plates is noted in this district, and a fair tonnage has been placed in the last few days, chiefly for bridge work. Steel structural orders continue light, though specifications on old contracts are good. Constantly improved deliveries are being made. Coal mining interests have come into the market for light rails, and a considerable tonnage is being placed at the recently advanced prices. Better deliveries are procurable on crude steel and the price is somewhat lower, open-hearth billets selling at $34.50 to $35 delivered. Sheet mills are losing ground and deliveries are still further delayed, one mill selling into this district being four months behind. In iron and steel bars the situation and prices are unchanged.

Old Materials.—Nothing has occurred during the week to enliven the market, which continues extremely quiet with prices on the same level which has held for some time. We quote f. o. b. Cleveland, as follows:

Old iron rails	$20.00 to 21.00
Old steel rails (over 6 feet)	14.50 to 16.00
Old steel rails (under 6 feet)	16.00 to 16.50
Old car wheels	16.50 to 16.75
Steel boiler plate	12.00 to 13.00
Steel axles	19.00 to 20.00
Malleable iron (railroad)	15.00 to 15.50
Malleable iron (agricultural)	13.00 to 13.50
Heavy steel	15.00 to 15.50
Country mixed steel	13.00 to 13.50
No. 1 R. R. wrought	15.50 to 16.00
No. 1 busheling	12.00 to 12.50
No. 1 machine cast	13.50 to 14.00
Iron axles	22.00 to 23.00
Axle turnings	10.50 to 11.00
Wrought turnings (free from cast)	9.00 to 9.50
Grate bars	10.00 to 10.50
Pipes and flues	11.50 to 12.00
Tank iron	10.50 to 11.00
Hoop and band iron	7.50 to 8.00
Sheet iron	6.50 to 7.00
Wrought drillings	9.00 to 9.50
Stove plate	10.00 to 10.50
Cast borings	7.00 to 7.50

CINCINNATI.

Decreased Interest of Buyers, but Prices Show Little Change.

July 10.

Pig Iron.—The feature of the week has been the slackening of interest in the market on the part of buyers. The holiday, of course, was an interruption to business and brought traveling men in off the road, but this does not entirely account for the falling off in demand and inquiry. Prices remain practically the same as a week ago both in the north and south. Southern iron has been sold during the week as low at $13.00 Birmingham, but this quotation is rather exceptional. For the most part southern furnaces are quoting $13.25 to $13.50, but there is not much business done at the higher figure. Northern furnaces in the southern Ohio district are still on an asking basis of $16.50, but this quotation has been shaded on desirable business.

It appears that buyers who needed iron by the first of July, took advantage of the decline in the southern market and covered their wants for the next three to six months, and those who could wait for the situation to become clearer, held off. Now that the market has made some recovery, these buyers who have not covered have decided to hold off in the belief that prices may again recede. This is regarded as the cause for the present lull in demand and inquiry.

Advices from furnaces both north and south give evidence of confidence in the firmness of the situation, and order books now have a much better look than a month ago. One of the leading Virginia furnaces has advanced its price to $16.00 at furnace, having sold enough iron at its $15.00 price to justify the advance.

Ferro-manganese is again attracting attention and sales at $92.00 per ton f. o. b. Pittsburg are reported. Virginia basic is quoted at $16.00 furnace and rather scarce. Valley basic is in light supply and quoted at $17.25 furnace. We quote f. o. b. Cincinnati.

Southern Foundry No. 1	$16.50 to 17.00
Southern Foundry No. 2	16.00 to 16.50
Southern Foundry No. 3	15.50 to 16.00
Southern Foundry No. 4	15.00 to 15.50
Southern Foundry No. 1, soft	16.50 to 17.00
Southern Foundry No. 2, soft	16.00 to 16.50
Gray Forge	14.50 to 15.00
Northern Foundry No. 1	18.15
Northern Foundry No. 2	17.65
Northern Foundry No. 3	17.15
Jackson County Silvery, 8 per cent	21.15 to 21.65
Southern Charcoal	24.00 to 25.00

Finished Material.—The market is steady with jobbers finding a fair demand. Prompt deliveries on structural shapes still command premiums. Bar iron is unchanged.

We quote bars at 1.63c, half extras, with dealers quoting 1.85c for iron and steel out of store. Galvanized sheets, No. 10 and No. 12, in car lots are 2.68c. We quote black sheets, No. 27 at 2.53c in car lots of 500 bundles. Black sheets out of store are selling as follows: No. 28, 2.90c; No. 27, 2.80c; No. 16, 2.25c; No. 14, 2.15c; No. 12, 2.10c. Tank plates are firm and sell out of store at 2c to 2.10c for ¼-inch and 2.10c for 3-16, Nos. 8 and 10. Beams and channels are quoted at 2.25c to 2.35c from stock and angles at 2.10c to 2.15c for base sizes.

In merchant pipe trading is good in volume and there is a fairly steady market at unchanged quotations. We quote f. o. b. Cincinnati:

MERCHANT PIPE.
(Basing Discounts)

	Steel Pipe		Guaranteed Wrought Iron Pipe	
	Black Per cent	Galv. Per cent	Black Per cent	Galv. Per cent
⅛ and ¼ inches	69.7	53.7	....	....
⅜ inch	73.5	61.3	....	....
½ inch	73.7	61.7	....	....
¾ to 6 inches	77.7	67.7	....	....
7 to 12 inches	72.7	57.7	....	....

Coke.—The market is stronger in tone and prices are slightly higher than a week ago. Some contracting is being done by foundries for supplies covering the last half of the year. Shortage of labor in the coke fields is said to be the main reason for advancing prices. We quote prices at the leading coke producing districts as follows:

Wise County, Va. Furnace Coke prompt shipment	$2.50 per ton
Wise County, Va. Foundry Coke on contracts	$2.65 to 2.75 per ton
Pocahontas Furnace Coke prompt shipment	$2.10 to 2.25 per ton
Pocahontas Foundry Coke on contracts	2.65 to 2.75 per ton
Connellsville Furnace Coke prompt shipment	2.50 to 2.75 per ton
Connellsville Foundry Coke on contracts	2.75 to 3.00 per ton
New River Foundry Coke on contracts	2.75 to 3.00 per ton
New River Furnace Coke, prompt shipment	2.50 per ton

†Wise County, Va., Coke on Furnace contracts is sold mainly on a sliding scale basis for pig iron prices on the following basis: $1.65 to $1.70 per ton on $9.00 pig iron, plus 17 percent of the advance on pig iron above $9.00 Birmingham.

Old Material.—The demand continues light and the market is dull at unchanged quotations. We quote f. o. b. Cincinnati:

Old No. 1 railroad wrought, net tons	$14.00 to 14.50
Cast machine and foundry, net tons	12.50 to 13.00
Old iron rails, gross tons	20.00 to 20.50
Old steel rails, gross tons	15.50 to 16.00
Old short lengths, gross tons	16.00 to 17.00
Old iron axles, net tons	22.00 to 23.00
Heavy melting scrap, gross ton	15.00 to 15.50
Stove plate, net tons	10.00 to 10.50
Wrought turnings, net tons	9.00 to 9.50
Cast borings, net tons	7.00 to 7.50
Car wheels, net tons	16.00 to 16.50

ST. LOUIS.

Building Conditions Still Unsettled.—Pig Iron Firm.

July 10.

St. Louis, July 9.—Structural conditions are reported as unsettled, although the passing of the steel workers' strike was expected to improve the situation materially. The tying up of so large a quantity of steel, however, is having an effect not wholly unexpected. These conditions, however, are looked upon as being merely temporary and contractors anticipate a most successful season, though a few weeks ago the outlook was regarded as most unpromising.

Pig Iron.—Firmness is the keynote of the local pig iron market, with southern foundry No. 2 unchanged at $13.50 Birmingham. The decline of week before last appears to have been but the temporary result of the dissolution of the southern agreement. A supporting feature, according to local dealers, is the unusual labor condition in the Birmingham district. The scarcity of cheap labor is most marked in the southern iron camps. The urgent call of Kansas for harvest hands has taken large numbers of this class of workmen from the camps and the output has necessarily been lowered. Heavy demands in the east are also said to be partly responsible for the firmness of the market. Inquiries are heavy with medium sales. One St. Louis firm had an inquiry for from 3,000 to 5,000 tons of basic and quoted it at $18.50 to the prospective purchaser, with the further reply that a sale of 3,000 tons would be more satisfactory than one of 5,000 tons. Quoting for St. Louis delivery, the market is as follows:

Southern No. 1	$17.50 to 18.00
Southern No. 2	17.00 to 17.50
Southern No. 3	16.50 to 17.00
Southern No. 4	16.25 to 16.75
Gray Forge	16.00 to 16.50

Coke.—Prices are stiffening in the local coke market on account of heavy furnace demands. Orders for 1,300 tons were placed with a local dealer the latter part of last week, 700 tons additional being booked to purchasers by the same firm. Another sale of 1,600 tons of Piedmont smithing coal is reported.

Finished Material.—Inquiries for steel rails are most active at present. The sale through the local offices of 10,000 tons for 1907 delivery by the leaders of this line to the St. Louis & San Francisco railway last week, seems to have been but a forerunner of several deals of about the same magnitude. The local offices of another concern report from several western roads which are contemplating improvements and it is estimated that 60,000 tons have been contracted through St. Louis representatives within the last two weeks. Extraordinary construction in electric railways throughout Missouri and the southwest has created a heavy demand for light rails and many orders for quick delivery seemingly cannot be placed. Sales and inquiries for merchants' steel and heavy hardware are reported to be unusually good.

Old Material.—The market in old material is practically at a standstill, the mills having closed for repairs. Stocktaking and disposing of scraps is occupying the attention of dealers. Prices are unchanged with slight demands.

PHILADELPHIA.

Demand is Slack and Some Concessions in Prices are Being Made.

July 10.

Pig Iron.—So far as new business is concerned the past week has been a rather quiet one, a fact readily accounted for by the interruption of the Fourth of July and the usual July closing of many consumers. In the hope of securing lower prices many of these are still holding off from commitments for the last quarter, but furnace men have so many orders on hand for July, August and September delivery, and many of them are already so far behind in deliveries, that they are not bothering much about the future. Rather than let old customers go, some of them have been making small concessions in prices, but it cannot be said that the market is weak. Few large sales are reported, but the number of small ones continues impressive. A Lehigh valley industry placed an order for 3,500 tons of foundry at a price considered entirely satisfactory, and some rather large sales of basic have been made for a New York enterprise just getting under way. A study of the business for the first half of the year engenders an optimistic feeling for the last half. Prices, which show some concessions, may be quoted as follows:

No 1X Foundry	$18.75 to 19.00
No. 2X Foundry	18.25 to 18.50
No. 2 Plain	17.75 to 18.00
Standard Gray Forge	16.00 to 16.25
Basic	17.60 to 17.85
Low Phosphorus	24.50 to 25.00

New Material.—A large amount of new business has developed since July 1, particularly for plates and structural material, but the productive capacity

has now become so great that these orders are being taken without premiums. The activity of local mills confirms the encouraging reports from Pittsburg. Prices, which show no change from last week, may be quoted as follows:

Beams, channels and angles according to specifications, 1.83½c to 2c; refined iron bars, 1.63½c to 1.73½c; steel bars, 1.63½c to 1.73½c; plates, 1.73½c to 1.83½c.

Old Material.—Several strikes have been added to the other causes, such as embargoes and July closings, which have checked the demands for scrap, and the result is almost complete stagnation. Prices have sagged still further and may be quoted as follows:

Old steel rails	$16.00 to 16.50
No. 1 steel scrap	15.75 to 16.00
Old steel axles	18.25 to 18.75
Old iron axles	24.50 to 25.00
Old iron rails	19.50 to 20.00
Old car wheels	16.00 to 16.50
Choice scrap, R. R. No. 1 wrought	17.25 to 17.75
No. 1 yard scrap	15.50 to 16.00
Machinery scrap	15.50 to 16.00
Low phosphorus scrap	19.00 to 20.00
Wrought iron pipe	12.25 to 12.75
No. 1 forge fire scrap	13.00 to 13.50
No. 2 forge fire scrap, ordinary	9.50 to 10.00
Wrought turnings	11.00 to 11.50
Axle turnings, heavy	12.00 to 12.50
Cast borings	9.00 to 9.50
Stove plates	11.00 to 11.50

Metal Market

NEW YORK.

July 9.

Pig Tin.—Statistics for the half year are unfavorable and the market is weak and lower. The following are today's quotations: Spot, 31¼ to 37¼; July, 37.05 to 37.25; August, 36¾ to 37; September, 36½ to 37; London, £170 and £167 17s 6d. Arrivals for the month to date, 975 tons; afloat, 2,532 tons.

Copper.—The output and imports of copper have shown a gain and the market is dull and nominal. Today's quotations: Lake, 18½ to 18⅝; electrolytic, 18¼ to 18¾; casting, 18 to 18⅛. London, £81 7s 6d and £80 7s 6d. Exports for the month to date, 2,751.

Lead.—Refined lead although it has recovered to a certain extent is still dull. Today's closings, 5.75 to 5.80; St. Louis, 5.80 sellers. London, £16 7s 6d.

Spelter.—The demand has been light and the market is dull and lower. Today's quotations: 5.92½ to 5.97½; St. Louis, 5.85. London, £26 17s 6d.

CHICAGO.

The metal market is stationary. Demand is light and prices without change. Lake copper is quoted for spot delivery at 18½c; electrolytic, 18⅝c, and casting, 18¼c, later shipments ¼ of a cent lower. Pig tin, 39c to 42c for car lots, and 1c to 1½c higher for smaller quantities. Spelter for prompt delivery is held at 6.15c to 6.20c for car lots; lead, desilverized, 6.05c to 6.15c for 50 ton lots; corroding, 6.55c to 6.65c for 50-ton lots; Cookson's antimony, 26c; other grades 24c to 25c; sheet zinc, $7.75 list f. o. b. LaSalle in car lots of 60-lb. casks; nickel 40c to 47c for round lots, and 50c to 60c for smaller quantities.

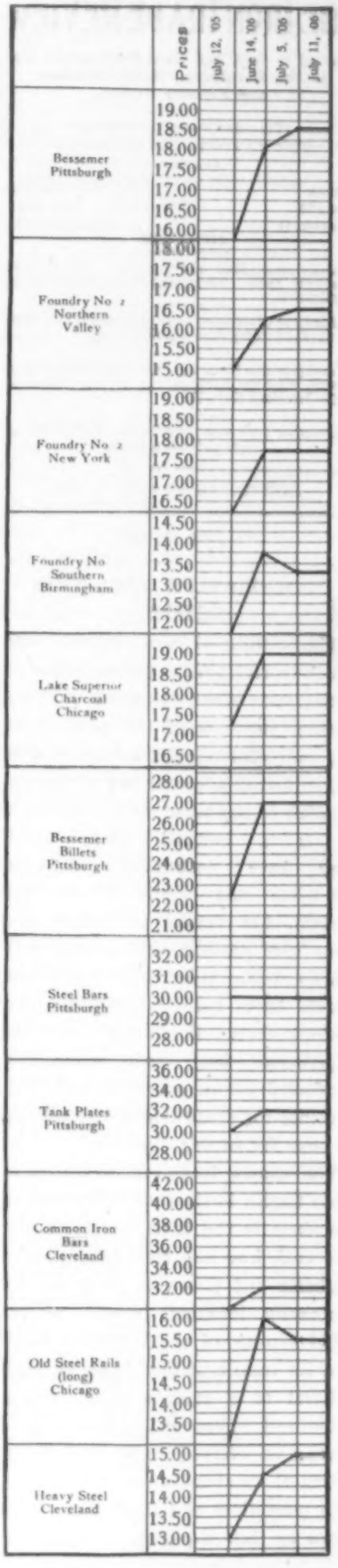
On old metals, we quote dealers' buying prices as follows: Copper wire, 16¼c; heavy copper, 16c; coper bottoms, 15¾c; copper clips, 15¾c; red brass, 15½c; red brass borings, 13¾c; yellow brass, 12¼c; yellow brass borings, 10¼c; light brass, 8¾c; lead pipe, 5½c; tea lead, 5c; zinc, 5c; pewter, No. 1, 24c.

ST. LOUIS.

St. Louis, July 9.—Buyers in the Joplin district succeeded in forcing zinc ore prices down $2 per ton for lower grades. High grade ores brought $48 per ton, but offerings generally were lowered to a basis of $42 for 60 per cent zinc. Earlier in the week, the basis was as high as $45. Shipments aggregated only 3,800 tons, one of the poorest weeks for this year. Spelter on the St. Louis market was firmer, one sale of 53 tons at $5.87½ being reported. Lead ore at Joplin was weaker, the offerings being from $2 to $6 per ton below those of week before last. The highest grades went at $75, with the bulk of sales in the neighborhood of $72. The decline in the ore market was reflected in the St. Louis metal market. One sale of 100 tons was reported Saturday at $5.75.

New Mexican Directory.—The United States last year sold Mexico over $50,000,000 worth of goods, and there is much reason for hoping that this amount could be largely increased by proper efforts. As means to this end, the Directory of Agencies, Mines and Haciendas, which has just been issued by Percy G. Holms, ought to be of much assistance. The section devoted to agencies contains the names of practically all the responsible business men in the country who are handling mining and agricultural machinery and supplies, giving their addresses, manufactures, etc. The information in regard to mines is very complete. The data for the section of haciendas has been furnished by the governors of the respective states of the Mexican republic, and its correctness is guaranteed. The directory contains over 6,000 names of owners of mines and haciendas in Mexico. The volume contains 400 pages and is for sale at $5.00 gold, by Percy G. Holms, Calle Tiburcio 18, Mexico City.

PRICE CHART.



THE IRON TRADE REVIEW

Devoted to Iron and Steel Manufacture and to the Machinery, Metal-Working and Foundry Trades.

PUBLISHED EVERY THURSDAY BY
THE PENTON PUBLISHING CO.
CLEVELAND

BOSTON DULUTH
CHICAGO NEW YORK
CINCINNATI PHILADELPHIA
PITTSBURGH

Subscription, $3.00 per annum. To Foreign Countries, $4.50. Advertising Rates Furnished on Application.

Change of advertising copy must reach this office ten days preceding date of publication.

The Cleveland News Co., will supply THE IRON TRADE REVIEW through the regular channels of the American News Co.

ENTERED AT THE POST OFFICE AT CLEVELAND, AS SECOND CLASS MATTER

PRINTED IN AN OPEN SHOP

July 12, 1906

IMMIGRATION AND THE SOUTH.

The cutting of new channels into which to divert the ceaseless stream of immigration is the task upon which industrial interests of the south have generally centered their efforts in their search for an adequate and permanent solution of the labor scarcity problem. It is a colossal work which they have undertaken, and so far has met with indifferent success, but results in other sections give promise that it may ultimately bring relief from conditions which have become desperate, and nothing short of failure after the experiment has been thoroughly conducted on an extensive scale will convince the south that it has nothing to hope for in this direction.

The causes leading up to the present labor famine in the south are reviewed elsewhere in this issue by representative coal, iron and steel producers of Alabama and Georgia. They are the practically inevitable results of the rapid growth of the industrial south and its transformation from an agricultural to a manufacturing section. Mills and mines and factories have sprung up everywhere to avail themselves of an abundant mineral wealth. The plantations and small farms have given up their workmen to supply the suddenly increased demand until this source has been exhausted. Competition among employers for such laborers as are to be had has advanced the plane of wages abnormally, and has made the workmen independent to an arbitary degree. With an increased earning capacity their level of living has advanced but slightly, and the amount necessary for their primitive needs, which formerly represented six days' wages, can now be secured by three or four days' work. The result, especially in the case of the negro laborers, has been to render them idle and thoroughly unreliable. Outside relief has been and still is exceedingly small, and the situation, acute as it has become, threatens still greater difficulties as the industries of the south continue to expand.

Foreign workmen have been employed with success by a number of mining and manufacturing concerns in Georgia and Alabama. The great problem is to secure them. The lines of immigration have been firmly established by the twenty-four millions who have come to America since 1820. Of the more than a million who landed during the past year, almost four-fifths entered through Ellis Island, New York, and it is well known that the direction of the immigration movement is approximately west from the port of entry. Baltimore, the most southern port of importance in this connection, admitted only 62,314, and the benefit to the south from this incoming flood of humanity was practically nothing.

The Southern States Immigration Commission, at the close of a recent convention in New York, established a bureau in that city to point out the opportunities of the south; a number of states maintain individual immigration departments, and in other ways efforts are being made to locate the foreigner where he is so badly needed. Better homes are being erected for their workmen, by a number of large southern concerns, and more attractive surroundings are being provided.

But the north still finds a ready opening for the immigrant. He is willing to locate there because his friends and relatives have settled there before him, and because he has been warned of the enervating climate of the south. These tendencies the southern employer must face with little to aid him but his pressing need of men. The contract labor law prevents him carrying his campaign abroad. He must fight it out at the port of entry against tremendous odds and results for the immediate future at least are certain to be discouragingly small.

DECREASING PROPORTIONS OF FOUNDRY AND FORGE PIG PRODUCTION.

While the total pig iron production in the United States in 1905 was reported by the American Iron and Steel Association early in the year, with details as to the distribution among certain grades, the full classification by grades has only been given out within the past fortnight, a table covering the past five years being printed elsewhere in this issue.

Of the new information thus made available, by far the most interesting is that relating to forge and foundry grades. The total pig iron production in 1905 was 22,992,380 gross tons, about 27 per cent greater than the production in either 1902 or 1903, in each of which years approximately 18,000,000 tons were produced, yet we find that the production of forge pig iron has actually decreased, by 17.6 per cent from 1902 and by 7.0 per cent from 1903.

The production of foundry iron in 1905, 4,755,288 tons, showed an increase over 1902 and 1903, but only of 23.5 and 7.9 per cent, respectively. The production of foundry iron has thus not kept pace with the general increase in pig iron production, while the production of forge has actually declined.

Several causes have contributed to this change in the general alignment. No doubt the most important cause as regards the change in foundry iron has been that the demand for rolled steel has increased much more rapidly than has the demand for castings. The next most important cause has been the growth of the steel casting industry,

which draws trade from the gray iron foundry, thus tending to reduce the production of foundry pig iron, while at the same time it tends to swell the production of steel making pig. A more remote cause, but still one which exercises an appreciable influence, is the increased quantity of pig iron, instead of scrap, which is used in basic open-hearth steel manufacture. In 1904 and 1905 the production of basic pig iron to basic open-hearth steel averaged about 50 per cent; in 1902 and 1903 the percentage averaged about 44. This increase in the proportion represents a growth in basic pig iron production greater than that in steel manufacture, thus swelling the total pig iron production and making the production of foundry iron constitute a less percentage of the total.

The moderate decrease in actual tonnage of forge pig produced, and the large decrease in the proportion which forge pig constituted of total pig iron production in 1905, as compared with 1902 or 1903, is less easy of explanation. It is hard to believe that there was any decrease in consumption of pig iron by cast iron pipe foundries which would account for the change or any considerable part of it. The decrease must have come chiefly if not wholly from a lessened demand on the part of iron mills. Unfortunately statistics of wrought iron production are lacking except for 1904 and 1905, the production of all rolled iron in 1904 having been given as 1,760,084 gross tons in 1904 and as 2,059,990 tons in 1905. Here is shown a very good increase, and there is little doubt that this increase has been fairly continuous for several years. Why, then, should the production of forge pig not have increased?

When the basic steel industry first attained important proportions there were predictions that an acute scarcity of scrap would be produced; that the industry would draw supplies which had been going to iron mills, and would still not be satisfied. In 1899 and 1900 the country was scoured for scrap and odd piles in out of the way places which had been accumulating for years were absorbed. It then became very hard for the iron mills to obtain scrap, at least at satisfactory prices. The basic open-hearth steel industry was still not satisfied, and an impetus was given to the use of direct metal from the blast furnace, which reduced the necessity for scrap, and to special processes which did not require scrap at all. By these changes it has become less necessary to have scrap in basic open-hearth steel manufacture. The industry uses more scrap than formerly, but the current outcome of scrap has increased and less scrap is used, proportionate to total basic steel production. This has resulted, during last year and this, in giving the iron mills a better opportunity to buy scrap at favorable prices, and they seem to have availed themselves of it, making a much larger product last year, yet using less pig iron. The course of the market has well shown this change. Until lately dealers insisted that heavy melting scrap was worth as much, delivered, as pig iron, or perhaps 15 per cent more, to the basic open-hearth steel manufacturer, and the market helped to bear out this view. In the past few months, on the other hand, heavy melting scrap has had a slump in the market, and sometimes has even reached a point where support was expected through the diversion of certain grades, long regarded as the particular choice of the basic open-hearth operator, to the iron mill. For the present month the leading interest has bought a large tonnage of heavy melting scrap, and has gotten it, delivered, at about $2.50 per ton less than Bessemer steel would have cost, and nearly $2.00 a ton less than basic pig.

Thus it would appear, curiously enough, that the demands of the basic open-hearth steel process were so large that it could not get enough scrap through absorptions from the iron mills, and therefore has found ways of getting along without, so that it can return some to the iron mills.

Some Bessemer pig iron has been at times used in the basic open-hearth furnace, and in any event comparisons like the following are not to be taken without some allowances, but it is worth while to make the following comparison, which shows for each year the percentage of basic pig iron produced to the production of basic open-hearth steel:

1896	43.3	1901	40.0
1897	52.7	1902	45.2
1898	50.1	1903	43.0
1899	47.4	1904	48.6
1900	42.1	1905	52.5

ORE MOVEMENT OF THE SEASON.

The movement of ore from Lake Superior docks during June was disappointing only in view of predictions that the total would be in excess of 5,500,000 tons. While this figure was not reached, the movement of 5,489,256 tons set a new record, being 264,636 tons in excess of the shipments of any previous month in the history of lake navigation. Early estimates of 38,000,000 or 40,000,000 tons for the season are apparently now out of reason, but there is substantial indication that the movement will exceed 36,000,000 tons. June may fairly be called a typical month under present conditions. There were neither labor troubles nor storms to contend with, but a depressing feature was present in the shortage of cars on the range railroads and the limited capacity of upper lake docks now being enlarged. Hence, while the month was on the whole a favorable one it was not excessively so, but was rather a fair sample of what may be expected during the remainder of the summer and fall. June shipments were practically 10 per cent in advance of those of June, 1905. Estimating that this ratio of increase is continued through the season, the movement from June 1, 1905 on, or approximately 22,650,000 tons, with a ten per cent increase or 2,265,000 tons, added to the movement to July 1, 1906, roughly 11,241,000 tons, would make a total for the season of 36,156,000 tons. Whatever the correct figure proves to be, at any rate it will represent pretty accurately the present capacity of lake shipping facilities. The weakest links in the ore freighting chain will be strained to the breaking point. So far these have proved to be the range railways and the ore handling provisions at the Superior docks. Practically all the modern freighters have had ample business, but ore interests have not suf-

fered for lack of vessels, and lower lake docks and railway facilities have been satisfactory.

A feature of the season is the extent to which Duluth is increasing its lead over the other principal ore shipping points. In June Duluth's output was 30.19 per cent of the entire movement and for the season to July 1, its average was 27.73 per cent. During 1903 and 1904 it averaged but 24.11 per cent of the ore shipments. With the three other leading ports near the head of the lakes, Two Harbors, Superior and Ashland, it loaded 77.6 per cent of the ore brought down during June against 74.54 per cent as the average for 1904-5.

THE WORK OF CONGRESS.

The session of congress just closed certainly deserves the name "A Congress of Achievement," claimed for it by its leaders, but whether the measures enacted will in all cases prove wise remains for time to determine. There were, of course, some acts of omission, the principal one being the failure to pass the shipping bill, but advocates of this measure are confident that it will be passed next winter. Never before in the history of the country have its business interests received so much attention from the law makers. Three of the principal enactments, the railroad rate bill, the meat inspection bill and the pure food bill, were aimed to control three most important industries. In some quarters there is a disposition severely to criticise the attitude of congress and to predict calamity as the natural result of the enforcement of these newly enacted laws. For example the *Financial Chronicle* declares: "A fundamental fact to be noted which must sooner or later have a large influence in shaping security values, is that bills have been passed and signed by the president during the session just closed conferring upon the government or commissioners control of large classes of business organizations to the extent of forcing them to accept a remuneration for the work they do which will curtail a material loss in net income." As proof of this assertion the *Chronicle* refers to the rate bill, the disposition of the Interstate Commerce Commission to take the part of shippers and the action of several state commissioners in reducing rates. It seems to us, however, that the *Chronicle* does not prove its case. The result of the enforcement of the new law will depend to a very large extent upon whether the commissions act wisely or not, and until the contrary is proved we are willing to give them credit for ordinary wisdom and patriotism. The complaint against the railroads has seldom been based on excessive charges, but almost invariably on alleged discriminations. If the new law results in giving all shippers a square deal, without a general reduction of rates, its purpose will be effected, and the railroads will not suffer. Even in cases in which there have been reductions disaster has not always followed. For instance, in the state of Ohio the legislature a few months ago reduced the passenger fare from three cents to two cents per mile, and while details as to the effect of this law upon earnings have not been published, railroads doing large passenger business in Ohio are showing increased earnings. New trains have been put on, service has improved and there is abundant evidence of prosperity. It is evident to those who travel in that state that the passenger traffic has increased since the new law became effective.

As to the meat inspection and pure food bills, we also believe that business interests have no reason to be alarmed. The careful inspection of meats and the assurance that buyers will be protected from fraudulent practices on the part of dealers in foods cannot injure any honest business.

On the whole, we do not believe there is any justification for sweeping denunciation of congress for its recent enactments. It has acted in accordance with what seemed to be demanded by public sentiment, and had action been delayed much longer, legislation of much more drastic character would no doubt have been placed upon the statute books in response to the clamor of an indignant public.

The Oil City Iron Works, Jennings, La., has absorbed the Dobbins Iron Works, of that city.

ANOTHER MODEL TOWN NEAR CHICAGO.

Another model manufacturing town is to be located near Chicago. It will be called Burnham, will be located on the Calumet river just outside of the southern end of Chicago, and will have for its nucleus the Western Steel Car & Foundry Co.'s plant. A tract of about 62 acres has been purchased by a syndicate of which A. C. McCord, president of the Western Steel Car & Foundry Co., is the head. The other members are: Henry Russell Platt, attorney; John H. Mitchell, western sales manager of the Pressed Steel Car Co.; Burt J. Fitzgerald, real estate broker; Clive Runnells, sales manager of the Western Steel Car & Foundry Co., and Charles McKinstrey Nichols, all of Chicago; J. S. Andrews, of the American Steel Foundry Co., and D. W. McCord, vice president of the Western Steel Car & Foundry Co., of New York city. The tract has excellent shipping facilities with deep water transportation on one side and 11 railroads offering connections on the other. Plans for the building of the town are under way, and it is stated that 100 houses will be erected at once and 150 more as soon as possible. The business district will contain bank, library and stores.

Car Plant Enlarges.—The Butler Bolt & Rivet Co., Butler, Pa., has been granted a charter. This concern will be a constituent company of the Standard Steel Car Co., together with the Butler Car Wheel Co., and places the parent company in a position to be entirely independent of the open market. The company has increased its output materially, and is entering into the various forms of steel cars, such as mail cars, baggage and passenger coaches, as well as the ordinary steel freight cars and steel underframe cars. Two additions, one 240 x 500 feet to the main building, and a wing 80 x 800 feet, have been made to the plant.

The Bell & Fyfe Foundry Co., Kent avenue and South 11th street, Brooklyn, has sold its property in that city and has leased the old Astoria steel foundry, Astoria, L. I. Operations at the new location will begin Sept. 1 when the firm will be in a position to handle castings of any weight up to 50 tons.

The Dover Forge & Iron Co., Canal Dover, O., is installing a modern 20-inch mill for rolling grooved charcoal iron, steel and shovel skelp, and will be in position to make deliveries about the 15th of July with a specialty of charcoal iron skelp for locomotive tubes.

SITUATION IN THE STRIKE CENTERS.

(Special Telegram.)

Buffalo, N. Y., July 11.—Buffalo foundries are now operating with only a little less than their full quota of men. Strike matters are rapidly clearing up and the open shop is prevailing. No firms have signed agreements with the molders' union though several still recognize the organization. Foundrymen confidently predict that so far as the molders are concerned Buffalo will soon be a complete open shop city. In most of the foundries where men were paid $3.50 a day and struck for an advance they have returned to work on a $3 wage scale.

About 75 molders are employed in the foundry of the Buffalo Forge Co., which has begun operations in its recently constructed works, and 450 in the entire plant. It expects soon to have a full force of molders working on an open shop basis. As a result of the strike the Buffalo Scale Co. has tried the experiment of installing molding machines. These are operated by handy men.

Developments at Milwaukee.

Judge J. V. Quarles, of the federal court at Milwaukee, Wis., who issued an injunction against striking molders formerly employed by the Allis-Chalmers Co., heard arguments upon the injunction Friday of last week, but granted a continuance for a week to permit the prosecution to file affidavits in answer to the defense. The judge took occasion to explain that he did not consider the injunction sweeping, as has been alleged by the labor union element.

"The order," he said, "has been widely misrepresented, and I am at a loss to account for it. If there is a clause in the order that is unduly repressive or that has not been upheld by the supreme court, I should be glad if counsel would point it out to me."

W. B. Rubin for the defense argued that the clauses forbidding picketing and forbidding the strikers to visit the homes of non-union men interfered with the rights of the strikers as citizens. To this the judge replied that a close study of the order would show that the strikers were not enjoined from picketing or from visiting the homes of non-union men when there was no intention of intimidating the non-union men, or of committing acts of violence. The defense, proceeding, showed by affidavits that while 1,000 or more men were affected by the strike, only two strikers had been arrested, and that these had been acquitted.

The character of the fight being waged in the Milwaukee strike is shown by resolutions recently adopted by the Federated Trades Council, which declare that "Judge Quarles either willfully, to oblige a prosperous employer, or through ignorance of the constitutional rights of the people, has in effect set aside the constitution of the United States by depriving the members of the Iron Molders' union of the right to exercise the guarantees of free speech and the right of peaceable assemblage when or where they desire."

The resolutions further review the fact that both "Thomas Jefferson and Abraham Lincoln pointed out long ago the danger that confronted a free government such as ours because of the development of a system of appointed judges, who, not being responsible to the people, would be ready to ignore the people's rights as guaranteed by the constitution." An appeal to President Roosevelt for the removal of Judge Quarles was provided for.

The strike of molders at Milwaukee remains unchanged. The employers are constantly putting on additional men, and the output of castings amounts to 50 or 55 per cent of the average preceding the strike. The Falk Co. is said to have reached 85 per cent of the usual amount. Over 800 molders are at work in the struck shops and from 200 to 300 tons of castings are being received here daily from outside points.

At Milwaukee writs of attachment have been issued against members of the Iron Molders' Union who failed to appear for examination before Court Commissioner Hazelton under the discovery statute at the instance of the Vilter Mfg. Co. Frank Wolfe, as president of the Iron Molders' Union No. 84, has been sued by Farrar & Trefts, foundrymen of Buffalo, for $10,000, and a demand has been made for an injunction restraining the members of the union from harassing the men employed in this foundry.

The General Situation.

The National Founders' Association, in a statement recently issued to its members, calls attention to the question of union recognition and domination, which, it states, is the main question at issue. "The formal closed shop agreement recently demanded by the union," it explains, "has been set aside by their officials as an impossibility at the present time, and the attempt to resurrect this system of union recognition has been a dismal failure."

The strike situation throughout the country is reviewed at length. Progress in the operation of shops, though with no important change, is noted in Chicago, St. Paul, Minn.; Kansas City, Hazelton, Joplin, Mo.; Topeka, Kans.; Toledo, Kalamazoo, Anderson, Montreal and in other centers.

Nine foundrymen in Scranton, Pa., and vicinity have posted an open-shop declaration at their plants. These are the Allis-Chalmers Co., S. G. Barker & Son, Exeter Machine Works, Finch Mfg. Co., Jeansville Iron Works, McClave, Brooks & Co., Scranton Steam Pump Co., Scranton Machine Works and Touhill Iron Works.

At Beloit, Wis., one foundry affected has been equipped with specially designed machines, and, it is reported, is making excellent progress.

Several of the firms originally involved in the strike at Boston and vicinity, it is stated, have adjusted the matter of wages and their men have returned to work. The demand was for an increase of 25 cents per day on the minimum of $2.75 for a nine-hour day. The Gibby Foundry Co. is operating with independent men.

In three of the struck foundries at Grand Rapids, Mich., it is stated, the men offered to return to work under the old conditions, and when this was refused, made additional concessions satisfactory to the proprietors. Three foundries employing 32 molders are at work, and four foundries employing 80 will continue to fight.

At Newark, N. J., nine foundrymen making heavy work are reported as having adjusted the matter of wages on the basis of $3.25 for the floor and $3 for the bench and for coremakers. The remaining shops in this vicinity are reported to have met this rate, though no agreement has been signed.

At Plainfield, N. J., the proprietors granted the demand of molders for an increase in the minimum wage from $2.75 to $3 for the nine-hour day already in effect. No agreement was signed. Before this arrangement could go into effect, however, one plant had struck because of the employment of an independent man on a molding machine. It has posted an open-shop notice.

At Holyoke, Mass., demands were made for a minimum wage scale of $3 with a reduction in hours from ten to nine. At the Dean Steam Pump Co.'s plant the nine-hour day was granted without any other concessions and no agreement was signed.

The foundrymen have taken no action on the demands of the molders in Akron, O., for a reduction in hours from ten to nine at a minimum of $2.75. The Dayton, O., foundrymen have steadily refused to confer with the

union on the demands presented in May. Minor disputes have arisen in a number of other cities for various reasons.

Local Unions No. 15 (machinery), 111 (bench) and 427 (coremakers), Iron Molders' Union of North America (Philadelphia), have adopted a resolution declaring their organization willing to assist the national organization to the full extent of their power while the principles of the organization are in jeopardy.

At Springfield, O., the piano plate molders to the number of 160, with an equal number of helpers, struck July 5 for an increase of 15 cents on each plate and a reduction in hours from ten to nine. The Wickham Piano Plate Co., the O. S. Kelly Co. and the N. H. Fairbanks Co. are affected.

The Columbus Strike.

Columbus, O., July 11.—One hundred and sixty molders and coremakers are out on strike here owing to the failure of the employers and employes to come to an agreement on a renewed scale. The last scale of wages expired June 1 and negotiations, which have been under way since April, were broken off July 5 when the men quit work. The molders demand an increase from $2.85 to $3.10 and the coremakers want $2.75 a day, heretofore having received $2.50.

The stove foundries are not affected by the strike, the molders continuing to work under a national scale agreement entered into between the Stove Founders' Defense association and the Iron Molders' Union of America.

All the larger employers of molders and coremakers have allowed their plants to be closed down. They embrace the Jeffrey Mfg. Co., the Hayden Pipe foundry, Schillings foundry and the Buckeye Steel Casting Co. At the last named plant the men have been out on strike for several weeks owing to the refusal of the molders to use patterns said to have been made by a non-union shop in Milwaukee. Several plants are not affected, having signed the higher scale before the strike was declared. They are the foundries of O'Brien Bros., H. Loudenslager and Edwin Paulton. Since the strike began the Meter Lock Co., employing two molders, has signed the scale and the foundry is in operation.

The Jeffrey Co., the largest employer, is making arrangements to operate its plant with non-union men and has purchased a residence adjoining its plant, which it has barricaded for the use of men it intends to import.

The employers claim that the molders treated them unjustly by declaring a strike while a conference was pending between the rival forces.

CONSTRUCTION RECORD

Set by Carnegie Steel Co. in Erection of New No. 4 Open-Hearth Department.

The Carnegie Steel Co. has made a remarkable construction record on its No. 4 open-hearth department at the Homestead plant, the first heat being poured exactly 174 days from the time the first drawings were made. This new plant contains ten basic open-hearth furnaces of 55 tons capacity each, and provision has been made for the erection of four additional furnaces. They occupy a building 137½ feet wide by 828 feet long about the middle and on the south side of the Homestead plant and cover the ground formerly occupied by "Pottersville," all the buildings of this small city having been torn away to make room for the foundation excavations of the new department.

The new open-hearth department is of the ordinary two level type, and is typical of similar departments at Donora, Duquesne and Clairton. It will have a monthly capacity of 35,000 tons of open-hearth steel. The scrap, hot metal and other material enters the open-hearth department on an overhead structure passing over the P., McK. & Y. and P., V. & C. railroads and the ingots pass from the pouring floor through a tunnel or subway under the P., V. & C. railroad and are delivered to the steel works near the 40-inch plate mill.

The Carnegie Steel Co. has kept an accurate record of the time consumed in the construction of the plant, the amount of material excavated for foundations and subway, and of the new materials placed in the improvement and when it is shown that this enormous amount of work was performed in 174 days the result is remarkable. The first drawings for this plant were made January 9, 1906, and the first ground was broken January 15. Gas was turned into the first furnace June 21 and the first heat was poured last Monday, July 9. There are at the present time four furnaces ready to operate.

Some idea of the size of the undertaking may be obtained from the following figures, showing weights and measures of material taken out to make room for the improvement and that placed into the buildings, yards, approaches and furnaces in erecting the new plant.

Number of furnaces	10
Capacity of each	55 tons
Building, size	137½ feet x 828 feet
Stock yards, size	62 feet x 792 feet
Mold yard, size	81 feet x 396 feet
Weight of O. H. building, stock yard, mold yard	5,580 tons
Rough castings: Iron	1,195 tons
" " Steel	42½ tons
" " Brass	4½ tons
Cubic yards excavated for over-head trestle and approaches	8,741
Cubic yards of concrete for same	7,875
Weight of structural material in same	1,163 tons
Cubic yards of excavating for subway (P. V. & C. R. R.)	16,126
Cubic yards of concrete for subway (P. V. & C. R. R.)	5,000
Structural material for subway (P. V. & C.)	176 tons
Length of subway	233 feet
Length of subway and approaches	1,350 feet
Trains passing over subway during construction	8 per hour
Weight of other structural material	1,650 tons
Total cubic yards, excavating	68,800
Total cubic yards, concrete	31,757
Total weight, structural material	8,300 tons
First drawing made	January 9
Ground first broken	January 15
Gas put on first furnace	June 21
First heat poured	July 9
Number of furnaces ready to operate now	4

ADDITIONAL PAPERS FOR THE LONDON MEETING.

The following papers are to be presented at the meeting of the American Institute of Mining Engineers to be held in conjunction with that of the Iron and Steel Institute in London this month, in addition to those given in the program published in THE IRON TRADE REVIEW of June 28:

"A Simple Distributor for Blast Furnace Charges," by David Baker, Philadelphia, Pa.

"A new Calorimeter for the Determination of Carbon in Steel," by Charles H. White, Cambridge, Mass.

"The Gas Producer as an Auxiliary in Iron Blast Furnace Practice," by R. H. Lee, Liberty Furnace, Va.

"Internal Stresses and Strains in Iron and Steel," by Henry D. Hibbard, New York.

"Heat Treatment of Steels Containing 0.50 and 0.80 per cent Carbon," by C. E. Corson, Latrobe, Pa.

"Methods of Mining, Hauling and Screening Coal at the Mines of the Aldrich Mining Co., at Brilliant, Ala.," by T. H. Aldrich Jr., Birmingham, Ala.

Continued discussion of the Gayley dry air blast process.

The Warwick Iron & Steel Co., Pottstown, Pa., has purchased from the Crocker-Wheeler Co., of Ampere, N. J., a direct current generator of 150 kilowatt, 250 volt to furnish additional power for its shop equipment.

The Trussville furnace of Lacey-Buck Iron Co., of Trussville, Ala., has been closed for relining and the owners expect to be ready for further operations by August 15.

ELECTRIC POWER IN THE GARY PLANT OF THE INDIANA STEEL CO.

The electrical generating station of the plant of the Indiana Steel Co., which the Steel Corporation is building at Gary, Ind., will have an initial capacity of 18,000 kilowatts, and will be so designed that extensions may be added indefinitely at one or both ends. The initial equipment will consist of 14,000 kilowatts in 2,000 kilowatt, 25-cycle 2,300-volt units, and 4,000 kilowatts in 2,000 kilowatts, 250-volt, direct current units. The above generators will be driven by nine Allis-Chalmers' horizontal, twin tandem gas engines. The power house building for the initial equipment is about 700 feet long, and has a span in the main building of 88 feet. It is also provided with an 18-foot extension under the same roof and extending the entire length of the building, to provide for the necessary high tension switches. The power house will be located immediately adjacent to the blast furnace blowing-engine houses, and between the blast furnaces and the open-hearth furnaces. It will, therefore, be in the most advantageous position for fuel supply, and also conveniently located for a minimum length of transmission lines to the various departments using electric power.

The rail mill will probably be the department using the largest amount of power. This mill is about one-half mile from the power house, and will consume approximately 10,000 kilowatts, nearly twice as much energy as is used by the city of Boston. Three cables will be required to transmit the current from the power house to the rail mill at 2,300 volts, each of 2,000,000 circular mils. The breaking down stands in the rail mill for reducing ingots to fair sized blooms will be driven by two 2,250-horsepower motors. The blooms will then go to the blooming mill which is operated by a 6,000-horsepower motor, and from there they will pass to the mills driven by two 4,500 horsepower motors, receiving their finishing passes in the mill driven by a third 2,250-horsepower motor. All the tilting and feed tables for the various passes, all hot saws, hot and cold pull-ups, the transfer tables, straightening machines and cold saws, and all auxiliary machinery of the mill will be driven by electric motors.

Publishes Sales Sheet.—The Atlas Engine Works, Indianapolis, Ind., has hit upon a novel idea of publishing a sales sheet for one day, May 31, 1906. Appearing on it are sales of 38 steam engines and 57 boilers, representing in all over 7,500 horsepower, which, it is claimed by the Atlas people, is the largest single day's sales of steam engines and boilers ever made by any steam engine and boiler manufacturer. It is estimated that the aggregate amount of these sales will run close to $50,000.

BETHLEHEM STEEL PLANS.

In a statement presented to the New York Stock Exchange, in connection with the listing of its securities, the Bethlehem Steel Corporation outlines its extension plans as follows:

Extensive improvements and additions have been made to the original plant, which comprise the addition of five open-hearth furnaces; the establishment of departments for the manufacture of crucible steel products, tool steel, staybolt iron and drop forgings; a machine shop for the manufacture of guns of small calibre; forges and a machine shop for the manufacture of projectiles; a machine shop for the manufacture of heavy machinery of special design; and iron, steel and brass casting departments. There was also acquired property for a proving ground, which has been fully equipped for testing armor plates, guns, gun carriages and projectiles, as well as for experimental purposes; also a property situated in Sussex County, N. J., containing a large deposit of limestone for use in the blast furnaces. The improvements and additions to the original plant from the time of the lease from the Bethlehem Iron Co. to December 31, 1905, have been made at a cost of approximately $5,000,000, and have been provided for out of the earnings of the company.

The original plant is now being still further enlarged by the erection of new blast furnaces with modern devices for the more economical handling of raw materials, and also other improvements, by which the production of the machine shops, drop forging department, crucible steel mills, etc., will be increased.

The company has recently acquired a tract of approximately 250 acres of land, adjoining its original plant, on which it is constructing a new plant for the production of rails and structural material. The new plant will consist of open-hearth furnaces, blooming and finishing mills for billets, rails and structural steel, having an estimated capacity of 500,000 tons of finished material per annum, and will be completely equipped with machinery for the handling of raw materials and finished products. pumping station, electric light and power plants, railroads, etc. Among the principal products of this new plant will be rolled beams and columns of new and special designs not heretofore manufactured in this country, but successfully manufactured abroad.

THE PRODUCTION OF FLUOR SPAR IN 1905.

The total production of fluor spar in 1905, as reported by Edmund Otis Hovey, of the United States Geological Survey, was 57,385 short tons, valued at $362,488, most of which came from the mines in Illinois and Kentucky. This is an increase of 20,933 short tons in quantity and of $127,733 in value, as compared with 36,452 short tons, valued at $234,755, in 1904. The production, furthermore, is greater than ever before, surpassing the previous record year, 1902, by 9,367 short tons in quantity and $90,656 in value. The companies report such active demand for fluor spar, particularly for use in open-hearth steel furnaces, that the production for 1906 is likely to exceed greatly that for 1905. The operators in Illinois and Kentucky are seriously hampered in working their mines by the difficulty of getting reliable and competent workmen.

The prices reported as received for ground fluor spar in 1905 were from $10 to $12 per short ton, with greater demand for the higher priced material than could be satisfied. In 1904 the average price received for this material was $8.44 per short ton; in 1903, $9.99, and in 1902, $9.98. Contracts have been made for a still higher price in 1906.

The highest grade of fluor spar, "American lump No. 1," is pure white or clear pale blue in color and does not contain more than one per cent of silica. The second grade "American lump No. 2," includes the colored varieties and is limited to a content of not more than four per cent of silica. This is sold in lump or gravel form and is used in the manufacture of open-hearth steel, because it imparts great fluidity to the slag. The third grade of fluor spar, "gravel," includes all of the mineral that carries more than four per cent of silica and all that is mixed with calcite. This material is used in foundry work on account of the clean character which it gives to iron castings. Through lack of knowledge of this property the demand for fluor spar for foundry work is much less than it should be.

Bar Mill at Brazil.—The Central Iron and Steel Co., a corporation to be formed at Brazil, Ind., has contracted with the Commercial Club, of that city, agreeing in consideration of a bonus to build and operate a three-train bar mill capable of producing 125 tons of bar iron per day, with four heating furnaces, six double puddling furnaces and other equipment. James McClelland is interested.

PERSONALS.

S. P. Egan, of the J. A. Fay & Egan Co., Cincinnati, is in California.

J. W. Downer, manager of sales for the National Tube Co., is spending his vacation at Saegertown.

J. W. Duntley, president of the Chicago Pneumatic Tool Co., has returned from a six weeks' trip in Europe.

J. W. Campbell, engineer of tests of the Pennsylvania Steel Co., at Steelton, Pa., has gone on a European trip.

Walter S. Russel, of the Russel Wheel & Foundry Co., Detroit, Mich., has returned from a two months trip to Europe.

E. J. Welch has been elected president of C. H. Brown & Co., Fitchburg, Mass., to succeed Walter F. Brown, of Boston, retired.

John W. Gates has leased the villa of the late C. S. Guthrie, in New London, Conn., and will spend the greater part of the summer there.

W. S. Lytle, superintendent of the Sharon plant of the American Steel Foundries, has been transferred to the Pittsburg plant of that company

S. F. Long has resigned as mechanical engineer of the Wheeling Mold & Foundry Co., Wheeling, W. Va., to become connected with the engineering staff of the Mesta Machine Co.

Samuel Mather, of the firm of Pickands, Mather & Co., Cleveland, is to be honored by giving his name to the ore freighter now under construction for that firm at the Wyandotte yard of the American Ship Building Co.

C. L. Bundy, who has been general foreman of shops of the Delaware, Lackawanna & Western, has been appointed manager of the car department of the Hicks Locomotive & Car Works, Chicago.

August Mann, for the past six years general superintendent of the Rankin plant of the American Steel & Wire Co., has taken charge of the Donora plant in the same capacity. He is succeeded at Rankin by James DeButz, of Chicago.

Willis G. Bowland has been elected to the directorate of the Ralston Steel Car Co., Columbus, O. The office of secretary and treasurer, which he held, has been divided and he continues as treasurer, while E. S. Culver, who has been his assistant, is made secretary and assistant treasurer.

A number of appointments at the Minnequa works of the Colorado Fuel & Iron Co. have been announced. T. M. Girdler is made assistant superintendent of the spike foundry and bolt factory, being transferred from the rail mill of which he was assistant superintendent. C. H. Guy becomes chief clerk to the manager of the company, with J. H. Robinson as chief clerk to the assistant manager.

C. W. Bray has left for his summer home in Canada, where he will spend several weeks of his vacation.

Julian Kennedy, dean of Pittsburg engineers, will sail for Europe during the latter part of July and remain there during the summer months.

Harry O. Price, Pittsburg district manager for Walter, Wallingford & Co., on June 30, married Miss Olive T. Schnell, of Cleveland. After a short honeymoon they will live in Pittsburg.

B. F. Jones, of Jones & Laughlin Steel Co., sailed for Europe July 6 and will remain there until about Sept. 15. W. L. Jones, general manager of the steel company, has returned from his trip abroad.

L. F. Fieser, of the iron firm of Fieser & Bentley, Columbus, O., has been made vice president of the Giant Nugget Silver Mining Co., a $1,000,000 concern, incorporated under Canadian laws.

Jones G. Moore, who recently resigned as president of the Birmingham Southern railway, the line which handles the raw and finished products of the Tennessee-Republic Co., has been appointed general superintendent of mining with the Sloss-Sheffield Steel & Iron Co. He succeeds to the vacancy caused by the resignation of T. C. Culverhouse, who will soon begin the development of some Alabama coal lands in which he is interested. Mr. Moore is succeeded as president of the Birmingham Southern by John A. Topping.

Following the recent sweeping changes in the official staff of the Bethlehem Steel Co., a number of other resignations and appointments have been announced. James Rawle, assistant to the president; John Leibert, of the forge department; Merritt Halliday, assistant general superintendent; and Edward Van Dyke, assistant superintendent of machine shop No. 2; James Watters, electrician; and W. L. Wright, Walter Schleifer and Joseph Welden, of the sales department, have resigned. C. A. Buck, chief chemist of the works, has been made assistant superintendent, with John Herbig, superintendent of No. 4 shop, as superintendent of all machine shops. The traffic department in charge of William Frederick has been abolished. Fred. Conlin, general manager of the Bethlehem Foundry & Machine Works, has been appointed sales agent of the company.

OBITUARY.

E. W. Rockwell, a traveling salesman for the Beck & Corbett Iron Co., St. Louis, died at Lewiston, Ill., June 20, at the age of 40.

Joseph P. Sanford, head of the firm of Sanford & Brooks, Baltimore, and a pioneer dock builder and railroad contractor, died July 4 at his home in Newark, N. J.

Francis Downer, salesman for the National Tube Co., St. Louis, Mo., and well known in the iron and steel business, died at his home in that city on Wednesday, June 27. He left a brother, J. W. Downer, general sales manager of the National Tube Co.

Francis Worcester, who was well known throughout the iron trade in the west, died at his home in St. Louis, June 28. Mr. Worcester was for a number of years connected with the National Tube Works Co., western distributing agents for the National Tube Co.

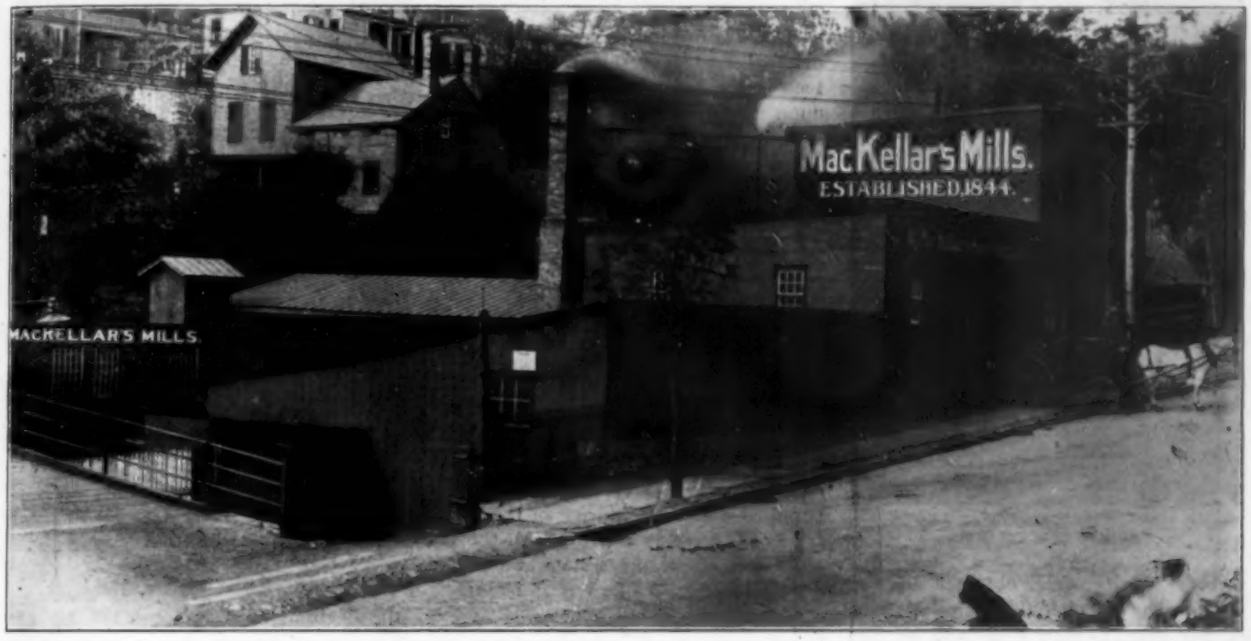
Charles Paine, author of "Elements of Railroading," and for ten years general manager of the Panama railroad and widely known as an engineer, died at his home at Tenafly, N. J., on July 4, in his 76th year. He began his railroad career as a boy on the Vermont Central railroad and rose to many positions of responsibility and importance. As a writer he was an authority on railroad topics.

George J. Laighton, of Brooklyn, died at the home of his brother-in-law, at Asheville, N. C., July 1. Mr. Laighton was born in Portsmouth, N. C., March 27, 1846. He received a common school education, served a time in the hardware store in his native town, and then found employment in the New York office of the Russell & Erwin Mfg. Co. He advanced through successive grades from stock boy to president, but retired from business about two years ago. He was a member of the Hardware Club of New York and of a number of other organizations.

George Y. Wisner, of Detroit, well known as a civil engineer, died July 3, after a brief illness. Mr. Wisner was born in West Dresden, N. Y., in 1841 and graduated from the University of Michigan. His career was largely concerned with surveys of the lakes and in work of reclaiming arid lands in the west by means of irrigation. He was appointed a member of the United States section of the International Waterways Commission in 1905. He was also a member of the American Society of Civil Engineers, Detroit Engineering Society and Western Society of Engineers.

THE ORIGINAL FOUNDRY FACINGS MILL.

The mill in Peekskill, New York, operated for nearly forty years by Robert MacKellar and recently rebuilt by the R. MacKellar Sons' Co. is the cradle of the facings industry in this country. Within its walls were developed the first formulas for mold coatings which could be depended upon to produce a smooth casting. The facings business was organized and classified into a definite industry and the different kinds of facings now in daily use were worked out in its modest office. The works under the management of W. H. H. MacKellar, the son of the original manufacturer of MacKellar's facings, are still turning out the old familiar brands and are grinding more material than the founder would have thought possible. Several of the brands supplied by other firms are ground in this mill.



THE PRESENT MACKELLAR FOUNDRY FACINGS MILL.

The original facings mill was originally not a facings mill at all. Instead of the black charcoal dust which now passes through the bolting machine, the primitive stones turned grain into grist, and white flour sifted upon the clothing of workmen. The elder MacKellar died in 1901 and the next year the quaint old mill was burned. It was a picturesque old structure, four stories high, with oddly shaped gables, windows stuck here and there at random, and a double Dutch door with a round hole in the lower half for the convenience of the cat. Its machinery was of the same quaint character, the shafting being in the form of huge beams of wood fortified at the bearing ends with iron gudgeons. Wooden gear wheels added their rattle to the whirr of the mill and the power was generated by three rustic water wheels, two arranged in tandem formation, one above the other, a pair of twenty feet in diameter dividing between them the forty-foot fall. Another wheel of larger diameter completed the first power equipment. Now there are modern turbine wheels and a steam plant to turn the wheels when the water in the old dam in Anville Creek runs low.

The old mill, no doubt, played its part in the American Revolution, for Peekskill long lay in the contested zone between the British and patriot lines. Tradition has it that bags were filled there more than once for which no accounting has ever been rendered. However, that has nothing to do with foundry facings.

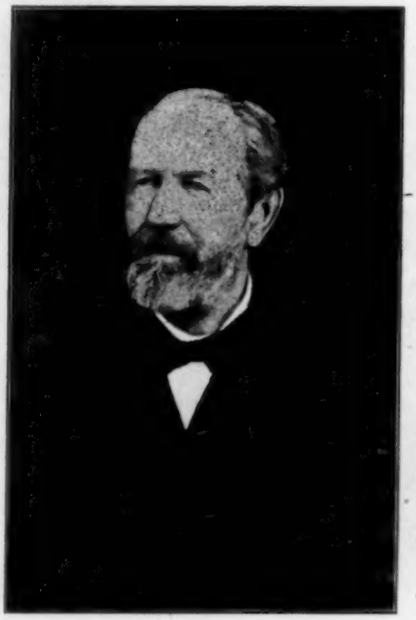
In the early part of the last century Peekskill was the center of great activity in the iron industry. Previous to the year 1830, a thriving foundry business had sprung up there, drawing supplies from the blast furnaces planted along the slope of the Hudson river bank. In those days the town was famous for its stoves, its ploughs and its platform scales. It still has reason to feel proud of its stove industry which now thrives on metal shipped in from distant points. The ironmasters of the old days were a peculiarly wideawake lot, and it was their dissatisfaction with methods as they found them that paved the way for the perfection of modern foundry facings. Before their day a smooth casting was a matter of luck tempered by chipping tool and file. They demanded a smooth stove plate direct from the mold and came to the old mill to help them out.

In 1837, one of the stove founders of the neighborhood brought sundry samples of soapstone to the mill then owned by one John V. Smith. The resulting powder proved to be fireproof, smooth and non-adhesive, and the manufacture of facings began. At first the soapstone rock was brought by wagon over the hills from Connecticut from a farm owned by a Yankee named Ferris—time has obliterated the initials.

About the same time, or perhaps a little before, Smith began to grind "sea coal" from Scotland for facings, the product being shipped chiefly to a house in New York named, Boyd & Pease. Along about 1844, Coffin S. Brown, a local foundryman, induced the owner of the mill to aid in a series of experiments with anthracite from Lehigh Valley, Pa. The powder was dusted on the mold with a bag and proved to be a great improvement. Later trials with mixtures of soapstone and Lehigh coal yielded still more satisfactory results and paved the way for the development of a successful heavy facing mixture.

Subsequently the old mill passed out of the hands of the illustrious Smith

and came into the possession of David Mandeville, Charles Quinn and Conrad Quinn. During their reign, foundrymen began to realize the need of more than one application of facing powder. Shortly after 1855 two different kinds began to be used, a heavy facing of soapstone and Lehigh coal for the fireproof ground and a top dressing of powdered charcoal. These men extended the research into the subject and produced a fairly good facing, in the modern sense, by adding a peculiar variety of fireclay which they dug out of the bank beside the mill. In those days the most satis-



ROBERT MACKELLAR.

factory results were obtained by the use of a heavy facing containing about 80 per cent Lehigh coal, and 10 per cent each of soapstone and clay, covered with a top dusting of charcoal.

But the enterprising trio seem not to have been successful financially, for the mill passed out of their possession into the hands of a mortgagee, Joseph L. Cook, a manufacturer of ploughs. He sold the property to Robert MacKellar, the real founder of the facings industry in this country. This was in 1862, and immediately what had hitherto been merely a desultory custom grinding business began to shape itself into a definite industry.

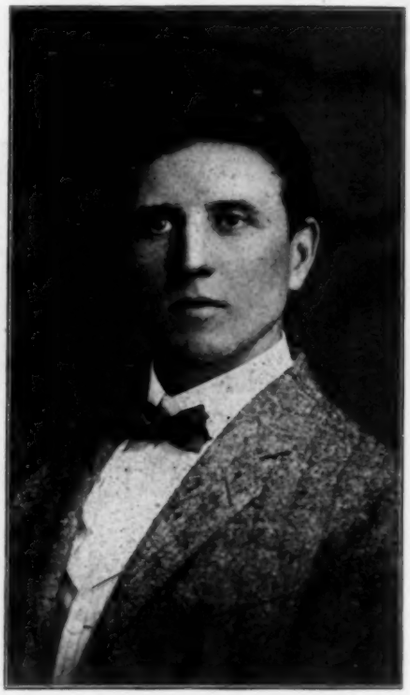
Robert MacKellar was a remarkable man in many ways. He was fond of books and had in his youth been apprenticed to a painter. A portrait of the boy painted either by his own hand or by the master still adorns the office of the mill. The new owner was interested in science and he spent much of his spare time in a laboratory which he fitted up largely with his own devices. There he tested the minerals of the neighboring country and with the aid of a crucible and a fire, like the alchemists of old, he added much to the knowledge of local economic geology. He discovered the presence of emery in the rock strata in the vicinity of Peekskill and also graphite which he promptly put to practical use. It was he who first suggested that something besides oyster shells might be used to flux a cupola. He placed upon the market a flux of his own which became famous among the foundrymen of the Hudson river valley as "Endolithic Marble." He also developed local beds of fluorspar and introduced the use of that flux into the foundries of the vicinity. Among the more notable of his other inventions is the well-known pipe heater used in connection with stoves and the original heater of this type made fifteen years before the device appeared upon the market, was in use about the mill until very recently.

Robert MacKellar soon saw the latent possibilities of the business which he had purchased. He began to attend conventions of foundrymen, to create a name for his goods and to apply principles of science to the manufacture of facings. He began to adapt certain kinds of mixtures to certain kinds of work and adopted definite methods so that the element of chance disappeared and the results gained were invariably those sought. The business grew rapidly and in a comparatively short time the old mill supplied all the foundries in the country as far west as Detroit. All the big stove makers of the sixties and seventies employed the MacKellar facings.

In those days the mill never ceased grinding day and night. It became a serious question to get enough packing cases in which to ship the output, and all sorts of barrels, boxes and even fish hogsheads were pressed into service. Modern methods of advertising had not yet been developed and news of the excellence of a product traveled by slow and natural routes. Mr. MacKellar's best advertising agent was the peripatetic molder who then as now migrated hither and yon, and by telling his new boss of the great things done elsewhere with improved facings he spread the demand.

Long before this time the power furnished by the old water wheels had become inadequate and a supplementary steam engine had been installed. The first engine used to drive the machinery was an early type of walking beam engine, one which had seen service in the hull of a steamboat probably plying between points on the Hudson. Copper and brass seem to have entered very largely into the construction of these old-time prime movers for when Mr. McKellar dismantled the old engine to make room for one of more improved type he sold the scrap copper and brass for about $800.

From 1880 on the business began to feel the effects of competition and distant demands began to be supplied from nearby sources. Perhaps the man who had developed the industry had an old-fashioned dread of advertising or he may have been philosophically content with the cares of a modest establishment. Anyhow for



W. H. H. MACKELLAR.

the declining years of his life his enterprise was confined to a comfortable local business and the mill supplied only a comparatively small territory.

On April 1, 1901, Robert MacKellar died and on April 1, 1902, the old mill was razed to the ground by fire. The heirs of the estate selected W. H. H. MacKellar to rebuild and manage the plant. Young MacKellar is a son of his father. He possessed the enterprise of youth and had gathered new ideas from the big world which lay beyond the borders of Peekskill. He had for some years been engaged in journalism, having served time on some of the big metropolitan dailies of New York. He saw an opportunity to restore the original facings mill to its place of supremacy in the trade of the country. He enlarged the capacity of the mill along modern lines, and has been compelled to build other additions to supply the demand which promptly came.

"The only mistake I made," said Mr. MacKellar, "is that I did not build large enough."

The new mill produces more facings than the founder would have thought possible. Besides the well-known MacKellar brands, large quantities are being ground for the trade at large, product which reaches the trade under other labels. Efforts are directed especially to the development of charcoal products of which a great variety are manufactured. The familiar stove plate facings and heavy facings of the firm are, of course, made in quantity, also Lehigh, soapstone and plumbago facings and a core wash. The grinding of sea coal has been abandoned for some years.

"Sea coal should never be ground in the same mill as true facings," said Mr. MacKellar. "A slight admixture is sure to occur and the result is invariably spotted castings."

Sea coal facings, he explained, are not properly foundry facings at all. They are mixed with the sand and serve rather to make the mold porous and furnish a vent for imprisoned gases. For this purpose the coal must be highly bituminous while the material for a true facing must be fire-resisting to prevent the molten iron from burning the sand. There have been a number of changes in the requirements of facings since the beginning of the industry in the early part of the last century, although the principle remains the same. The metal is run at a higher temperature now and in many other ways the requirements are more difficult to meet.

THE GEORGIA SCHOOL OF TECHNOLOGY.

The 21st of June marked the closing of the session of the Georgia School of Technology, Atlanta. Last September the school opened under some disadvantages, owing to the death of President Lyman Hall, whose untiring work had brought it to the attention of the south as the leading institution of its kind. The trustees placed Prof. K. G. Matheson, of the English department, in charge as chairman of the faculty, and the successful year just completed is no small tribute to the skill with which he has managed the institution.

Among the noteworthy items of general interest may be mentioned the completion of Lyman Hall Laboratory of Chemistry, which will stand as a monument to the late president, whose last work was the completion of a fund he had undertaken to collect in order to make the remainder necessary for the laboratory's completion available from the state.

The building is of brick with limestone trimmings. It is two stories in height, with a large basement in the rear, which can be used for a laboratory should occasion demand it.

On the first floor are a large and small lecture room, and the laboratory for elementary chemistry, accommodating over 200 students. Gas and water are supplied at each working space. Adjoining this is an ample stock room, from which supplies are dispensed to students. This supply room is connected by means of a hand lift with a similar room above, and with another below, where boxes are unpacked.

The second floor is taken up with a lecture room, spectroscope room, rooms for balances, organic combustions, photographic purposes, reading room, offices, and three laboratories for students, and one for professors. There are also a stock room, and a room in which all experiments with hydrogen sulphide are conducted.

The laboratory is equipped with two electric circuits. One supplies direct current from the school plant, for experimental purposes, while the other is the alternating current light circuit. The experimental circuit is available in lecture rooms, private laboratory, and in the combustion room. It is intended for use in electro-chemical analysis, and for electric furnace work, chiefly.

All laboratory rooms and lecture rooms are provided with flues leading to a large wooden chamber under the roof, the latter being exhausted by a large ventilator of galvanized iron. Forced draft will be used if necessary. It is hoped that by means of these, and a sufficient number of hoods, no serious complaint will be made concerning the air in the laboratories. When the supply of apparatus is enlarged, and new equipment for special work is obtained, this laboratory will enable the school to offer instruction in practically all of the branches of chemistry.

Of no less importance, perhaps, is the announcement that Andrew Carnegie has donated $20,000 for the erection of a library building, of which the school was in sore need. To meet this donation, the trustees have made a perpetual appropriation of $2,000 per annum for the maintenance of the library. This building will probably be started during the present summer.

To meet the growing needs of the mining industries of the south, the trustees have authorized the establishment of a course of four years, leading to the degree of bachelor of science in mining engineering. This new line of study will be inaugurated at the opening of the fall term, and will involve the addition of geology and extended work in mineralogy and assaying to the present equipment.

HESKETT-MOORE PROCESS.

Converting Ore Directly Into Steel Being Experimented On With Success.

(Special Correspondence.)

Toronto, Can., July 9.—D. H. Ross, Canadian commercial agent for Australia, reports to the Canadian department of trade and commerce, that experiments have for some time been going on with an improved process for the treatment of iron ore, known as the Heskett-Moore process. At a recent trial at the works of the inventors at Melbourne, a number of experts present expressed the opinion that the results were most satisfactory, and as a consequence predicted a revolution in the recognized methods of iron and steel manufacture.

The Heskett-Moore process is a method for directly converting iron ore into malleable iron or steel by a continuous system and, it is claimed, effects a saving of 25 per cent in the manufacture. The ore is concentrated by ordinary methods, or if it is magnetic, it is separated electrically until the pure oxide of iron is obtained. The oxide of iron is passed through a revolving cylinder heated by waste gases from subsequent operations, and brought in the cylinder to a dull red heat. It then drops from the cylinder to a second similar cylinder, where it is brought into contact with the deoxidizing gas, converting the heated ore into pure iron.

Accompanied by the deoxidizing gas, it is passed into a third chamber, or melting hearth, where it falls into a bath of molten iron and is converted directly into steel, or balled up as malleable iron. The whole process is automatic and the savings claimed for it are those of time, labor, fuel and avoidance of flux.

The inventors claim to have discovered a direct method of producing steel by one operation, instead of using the blast furnace and converter. The cost of erecting a large smelting plant on the Haskett-Moore system is put at less than one-fourth of that of a smelting plant on the existing methods of the same capacity. Any iron ore can be smelted by this process, but the immense deposits of iron sand in New Zealand are particularly adapted for the new treatment.

Patent rights have been applied for throughout the world and in some instances secured. Mr. Ross has forwarded to the department, a detailed description accompanied with blue print drawings of the process, copies of which will be available to Canadian iron manufacturers.

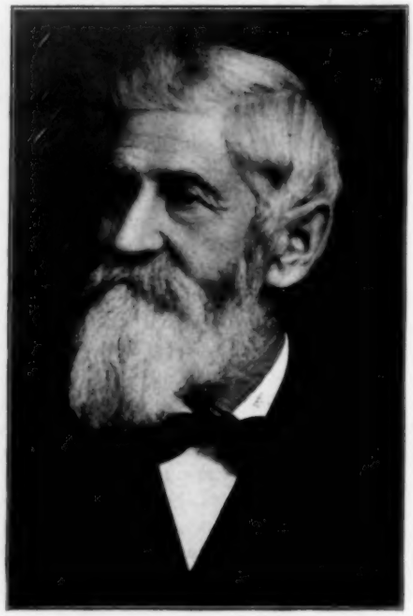
Reminiscences of the Hanging Rock Iron District.

In the establishment and growth of the iron industry of the middle west, the Hanging Rock district, comprising Scioto, Gallia, Lawrence, Jackson and Vinton counties in southern Ohio, and Greenup, Boyd, Carter and Lawrence counties across the river in Kentucky, played a most important part. While in both these states furnaces outside this district antedated the first within its confines, the progress of the Hanging Rock field in iron-making, once the industry had been established, was so rapid that these counties forged speedily to the front and during the half century from 1825 to 1875 were a leading factor in the manufacture of iron in the west. During this period some 90 furnaces were built, two-thirds of them on the Ohio side. With the clearing of the heavy forests which had built up the charcoal iron industry, however, this district began to wane. In 1880, 31 charcoal furnaces and 17 bituminous furnaces within its limits were in operation; ten years later this number had declined to 26, of which only 11 were charcoal furnaces, and the 15 years since that time have seen a still further decrease. The history of iron making in this district is of importance, among many reasons, from the fact that it produced a large number of furnacemen of prominence. This feature is emphasized in the following reminiscences of Elias Crandall, general superintendent of the Globe Iron Co., Jackson, O. His sketches of the Hanging Rock field of a half century ago have appeared from time to time in the Jackson *Standard-Journal*. They have been condensed for THE IRON TRADE REVIEW and are presented with essentially local features omitted.

* * * * *

In looking over the field I can find but five survivors of the large number who 50 years ago subsisted on the earnings of the blast furnaces in the Hanging Rock field. These are William N. McGugin, of Olive Furnace, O.; Col. William M. Bolles, of Portsmouth, O., Andrew Crawford, of Scioto Furnace, O., and Andrew Ricker, of Kirkwood, Mo., and the writer.

Early in 1853, my brother, who held the position of bookkeeper at Empire furnace in Scioto county, wrote me that he had secured for me a position as store-keeper at that place. Shortly thereafter I debarked from a western bound steamer at Junior Furnace Landing which was located three miles west of Greenupsburg, Ky. At the top of the river bank I found a man loading pig iron on a drag which with a yoke of oxen he was hauling down the margin of the river for shipment by steamer to the market. He told me that Empire furnace was eight miles distant and that cars were running between Junior Landing and Junior furnace which was on my way to Empire. Junior and Empire furnaces belonged to the same company, Glidden, Murfin & Co. The railroad track, I found, was a series of oak scantlings laid parallel at the requisite distance apart. The railway equipment



ELIAS CRANDALL.

consisted of several four-wheel trucks covered with rough boards on which to pile pig iron. A mule furnished the motive power. I was invited to ride, but I declined with thanks, telling the driver of the train that I was in a great hurry and must walk, and following the track I reached Junior furnace without difficulty.

Furnaces Built by Minister.

Junior furnace was originally christened Franklin Furnace Jr. It is located two miles east of Franklin and was the third furnace in the Hanging Rock region, probably being built six years after the completion of Franklin. Both were built and operated for a time by Rev. Dan Young, a minister of the M. E. church, who came to Ohio from New Hampshire.

Junior occupied a romantic location with beautiful hills to the north and west and had fertile level farming lands on the south extending to the river. The furnace stack was 28 feet high, built of sandstone and its linings, including hearth and inwall, were of a fine grain sandstone, particularly adapted for this purpose. The company had an extensive quarry from which it supplied itself and neighbors and shipped large quantities to line the furnaces in Tennessee. At that day all the furnaces in the region were lined exclusively with stone, as all experiments with firebrick had proven failures.

The furnace was built on the hillside, as were all furnaces of the period. The company owned probably 50 small dwellings and a half dozen or more commodious residences for its employes and officials, conducted a general store to supply all the necessities and the few luxuries of those days, had a blacksmith shop, carpenter shop and a barn which sheltered a large number of its oxen and mules. It also had a small frame building used during the week for school purposes and on the Sabbath for Sunday school and public worship.

The fuel used for making pig iron by Junior, and in fact by all the furnaces in the district at that day, was charcoal made on its own lands and from its own timber. In this process many thousand acres were denuded of forests which had been standing for centuries; and in later years the second and in some cases even the third growth of timber was cut and converted into charcoal. All old furnace hands understand that saplings, or young timber, make charcoal of much greater value than the original growth.

Ore From a Thin Vein.

Junior furnace was supplied almost exclusively with what is known as block ore. It usually consisted of a vein about six inches thick and very persistent through the hill. It was invariably red in color on the crop, but often changed to a light blue as it neared the center of the hill. This blue ore was so strongly impregnated with sulphur as to spoil it for immediate use in the furnace, but the writer knows from actual experiments that exposure to the action of the atmosphere for say three years will eliminate the poison and render the ore first quality. This block ore was fairly rich in iron, often showing 50 per cent by analysis and rarely less than 40 per cent. Jun-

ior depended upon remote localities for limestone for fluxing purposes as none existed on its own or nearby territories.

The community at Junior furnace boasted representatives of various localities, and had a larger percentage of Yankees than any other furnace; they came chiefly from New Hampshire. James Murfin was manager and a stockholder. He was a native of Adams county, O., going into the district while young, and was the chief owner and successful manager of Bloom furnace, Scioto county, for years. He later purchased an interest in the Junior and Empire furnace properties and became resident manager of the former. He had the reputation of being one of the shrewdest iron masters of his day. James E. Forsythe was founder at Junior and a member of the firm of Glidden, Murfin & Co. His ancestors in Pennsylvania had been identified with the iron industry for several generations. At an early date he came west and was founder at the old Steam furnace in Greenup county for a time, later moving to the Franklin furnace.

Nine Tons a Big Output.

Eventually Rev. Young sold the Junior to Glidden Bros., and Mr. Forsythe took an interest with them. Together they built an additional furnace four miles away, a more modern and pretentious plant, which they christened Empire. In those days, say up to 1844, the average output of a furnace would not exceed five tons per day, but in the following year Mr. Forsythe succeeded in increasing his daily outturn to eight and nine tons. News of this reached the ears of the Pennsylvania and Tennessee iron masters, who flocked to Junior furnace to ascertain if the report was true, and when convinced they offered Mr. Forsythe splendid inducements to take charge of their furnaces. He declined all offers, however, and told them frankly the secret of his success. "Gentlemen," he said, "increase the volume and velocity of blast injected into your furnace and your product will be increased proportionately."

Others connected with this furnace were Jesse Young, son of Rev. Dan Young, who was part owner and assistant manager at Junior, William M. Dobbings, who eventually became an expert furnace man, and had charge of a number of furnaces, and William S. Davis, grandfather of C. K. Davis, a well-known coal operator in the Wellston field. J. M. G. Smith, who later managed many plants in this district and in Tennessee, lived at Junior furnace 50 years ago. His last venture in the Hanging Rock field was the building of the Diamond furnace, immediately west of Jackson; this was dismantled nearly 40 years ago. Jacob H. Smith, whose actions as a brigadier-general in the U. S. army in the Philippines attracted wide attention, is his son.

On my way to Empire furnace, I stopped at the little city of Powellsville, which derived its name from three enterprising brothers: Peter, William and Jacob Powell, who then conducted a general store and kept a house of public entertainment there. They also owned a large number of teams and delivered iron ore to Franklin and Junior furnace. The oldest brother, Peter, years afterwards was the leading spirit in the building of Young America furnace, three miles northeast of Jackson. This furnace was dismantled 45 years ago.

The Empire Furnace.

A walk of 15 minutes further brought me to Empire, where I spent 20 years of my life. The furnace was built on what is known as Poplar Fork of Pine Creek, so called on account of the large number of poplar trees which grew on its banks. The company owned nearly 6,000 acres of timber ore land, two-thirds of which was in Scioto county and one-third in Lawrence county.

The stack was built of brick (the first one in the district) and it was said that over a million brick was used in its construction. The stack was 32 feet in height, probably the tallest in the region at that time. No pains or expense was spared in the building and equipment of Empire to make it equal, if not superior, to any furnace then constructed. The stack was for many years lined and relined with stone from the Junior quarry, but eventually a firebrick inwall was put in, and as it proved a success that custom was followed thereafter. The hearth, however, was always of stone. The engine was a new one made especially for Empire; it was of horizontal type and at that day was regarded as mammoth. The dwelling houses for employes were all neat and commodious structures built of hewn timber and placed in straight rows about 150 feet apart, giving each family sufficient ground for a good garden. The streets crossed each other at right angles.

Deer Park Near Furnace.

The furnace manager, O. H. Glidden, lived back a short distance at the foot of a hill in what was then considered a palatial residence. Immediately back of his house on the mountain side was his deer park, 20 to 25 acres surrounded by a very high fence; in this he kept from ten to a dozen beautiful deers. Mr. Glidden was next to the youngest of six brothers, all of whom were engaged or interested in the making of pig iron. My brother, Westey Crandall, was book-keeper and William Rudder was founder at Empire.

The Junior and Empire properties were operated under the style of Glidden, Murfin & Co. until 1859, when the two properties were separated and James Murfin and James F. Forsythe became owners of Empire, which was operated under the firm name of Murfin & Co., for several years until Mr. Murfin died. Then the property was brought to sale in partition and was bought in by Mr. Forsythe, who took in as partners L. T. Murfin, now of Jackson, O., J. B. Folsom, now of Fargo, N. D.; the writer and Major W. H. Nash, of the U. S. army, who died a few years ago with the rank of brigadier general. Empire was dismantled 35 years ago and her lands were disposed of in small parcels for farming purposes.

Franklin Furnace.

Franklin furnace, built in 1827, was the second furnace in the Hanging Rock field, and was owned and operated by Rev. Dan Young, who for many years was an important factor in the iron industry of this region. He was the Andrew Carnegie of the district at the time when millionaires were as scarce as hens' teeth, and when a man who had accumulated a few thousand dollars was regarded as rich.

Franklin was located in Greene township, Scioto county, a short distance from the Ohio river, and had an abundant supply of the same kind of ore with which Junior furnace was supplied. At the time of which I write there were practically no foundries, and all castings, pots, kettles, cooking and heating stoves and many similar articles were made at the furnaces. Franklin furnace employed quite a number of molders who caught the molten metal at casting time in ladles and poured it into the previously prepared molds in the open sand. When a boat load of castings had accumulated, they were loaded up and shipped to market down the river. Castings have not been made at these furnaces for more than a half century.

John Squires was one of the early managers at Franklin. M. Hart Tewksbury, who was for many years a prominent citizen of Portsmouth, O., and who died there, was for a long time book-keeper at Franklin. He later became a noted furnace owner.

Jacob Rocker was book-keeper at Franklin over 50 years ago and was later interested in a number of other furnaces in this region. Aleck Foster, who was connected with the furnace at that time, is now a resident of Tower Hill, Ill. The furnace a half century ago belonged to two brothers, J. T. Gould, the elder, who, with his family lived elsewhere, and O. B. Gould, who lived at the furnace and was manager in chief. The Goulds, like most of the others connected with this furnace, were natives of New Hampshire.

Harrison Furnace.

Harrison furnace, located a few miles north of Sciotoville, in Harrison township, Scioto county, was built in 1853 by Eifort, Stellman & Co. The owners and most of the employes were German. This furnace made several blasts which proved unprofitable, and then remained idle for a number of years until it was leased to Towne, McConnell & Summers, and put in blast with Mr. Summers as active manager.

In construction and equipment Harrison did not differ materially from the other furnaces in this district. Unfortunately it was located outside of the rich ore zone, and was entirely dependent upon uncertain seams of ore, which made the iron too expensive to afford any profit.

Samuel McConnell, a member of the firm of Towne, McConnell & Co., was for many years a leading business man of Scioto county; first, as a merchant at Wheelersburg, and later as a firebrick manufacturer at Sciotoville and pig iron maker at Harrison furnace. Henry A. Towne, the senior partner, was one of the original stockholders in the Globe Iron Co., of Jackson.

Stack Built of Sandstone.

Scioto furnace was built in 1828 by William Salters, a native of the Keystone state, in Bloom township, Scioto county, seven miles from the Ohio river, and 14 miles from Portsmouth. The stack was built of sand stone, and was located in an excavation made at the base of a hill, as were all other primitive furnaces. Its construction and equipment, including log cabins for the employes, and other features were almost identical with other furnaces of early days. It was not so favorably located as to ore supply as some other furnaces, but after passing into the hands of L. C. Robinson & Co., some valuable ore territory was acquired near Oak Hill, O., which was profitably utilized. Scioto was admirably located as to timber for making charcoal, being built in the midst of a dense forest. It was abandoned as a furnace a few years ago, but still maintains a growing community, owing to the establishment of a fire brick plant on its site. George S. Williams, a native of Pennsylvania, was for many years manager of Scioto and died there a few years ago. Andrew Crawford, for a time connected with the Clinton furnace, where his older brother was part owner, later acquired an interest in the Scioto furnace and served as manager for a part of the time until its abandonment.

Jackson furnace was built in Hamilton township, Jackson county, by Hurd, Young and others in 1838. This stone stack was 40 feet high, and it was equipped with all the modern improvements existing at that time. It was in the midst of a rich ore territory, consisting principally of block ore, which is now being hauled to Jackson every summer from contiguous land. Iron produced by the Jackson furnace up to the time that the M. & C. railroad was built had to be hauled a long distance to the river and transported to market by boats. After the railroad was completed the hauling by teams to the railroad was only about three miles.

Many pioneer iron men received their first training at the Jackson furnace. Among them were Jacob H. Ricker, M. T. Tewskbury and Jackson Gilliland. Newson Smith became owner and operated this furnace with great success 40 years ago. He had arranged to build a stone coal furnace near the site of the original furnace and had even placed considerable material for its construction on the ground when he was taken ill and died. The land was then parceled and sold. Isaac Brown, later connected with the Star Furnace Co., was for years a resident at Jackson furnace and was active in its management.

Some Short-Lived Furnaces.

Washington furnace was built in 1853 by John Campbell, John Bierce and others on the border of Lawrence county, three miles from Monroe furnace. It had a stack 35 feet high and 11 feet across the boshes. In the later years of its life it belonged to the company owning Monroe furnace under the style of the Union Iron Co. John Peters was one of the principal stockholders of this company and was also one of the projectors and builders of the Madison furnace, besides being the owner of Olive and Mt. Vernon furnaces, and interested in many other iron plants. His last furnace venture was the building of Monitor furnace on the Ohio river a few miles above Ironton in 1868. Washington furnace was dismantled about the same time as Monroe.

Pioneer furnace was built in Scioto county in 1856 not far from Monroe furnace by W. Colvin, Uri Tracy and others. This furnace was a small one and was not operated for any great length of time. It finally became the property of a Cincinnati attorney, Charles Fox, who added a rolling mill, but the property was abandoned many years since.

Cambria furnace was built in Jackson county not far from Oak Hill in 1854 by D. Lewis and others. It made iron for a number of years, but did not prove successful and was abandoned.

Limestone furnace, built in Jackson county in 1855 by Evans, Waterhouse and others, had a short career as a furnace. Its lands were sold to G. David, of Jackson, who now owns them.

Furnace Stopped on Sunday.

Jefferson furnace was built in Jefferson township, Jackson Co., in 1850, by the Jefferson Furnace Co., which was composed of Welshmen exclusively, and at the outset they adopted a rule as immutable as the laws of the Medes and Persians—that it should never run on Sunday. This furnace was almost an exact model of most of the others in this field, except that its stack was a few feet taller, being about 40 feet high. It was probably as advantageously situated for ore supply as any furnace in the regioin, being in the midst of a large territory of the very best limestone ore. It was arranged to make either hot blast or cold blast iron, but as its ores proved to be considerably better for cold blast metal, it usually made that grade and its product became a specialty in the market. I have heard that during the Civil War its agent contracted to deliver in Pittsburg 3,000 tons of cold blast iron at $90 per ton; this was its output for about six months. It is certainly startling to think of a little furnace of this kind turning out over half a million dollars' worth of iron in one year. It was a mine of wealth to its owners.

Thomas T. Jones had full charge of the finances of the Jefferson furnace for many years and was well known throughout the section as "Thomas T. Jones, Agent." At the organization of the Globe Iron Co., at Jackson, 33 years ago, he took a large amount of stock and was unanimously chosen president, a position he held without remuneration until his death. John D. Davies, who died at Oak Hill, O., two years ago, was one of the founders of Jefferson furnace.

(TO BE CONTINUED)

WILLIAM K. BIXBY.

A Man of Varied Interests—Valuable Services to the Public.

William K. Bixby, who retired from the chairmanship of the board of directors of the American Car & Foundry Co. at the recent meeting in New York, surrendered the position to devote his time to private interests. It was only upon the urgent insistence of the directorate that Mr. Bixby assumed the chairmanship six years ago and that with the understanding that he was to remain chairman only until he could bring about a harmonizing of all the interests brought into the consolidation. Mr. Bixby was regarded as the logical man for the undertaking. He thought he could accomplish the work in two years, but it proved a much more irksome task even than he expected and nearly six years were required. Mr. Bixby might have retired a year ago, but it has long been his desire to superintend the building of the main plant for the company and to have it located in St. Louis. Now that this has virtually been accomplished, Mr. Bixby feels that he can lay down the reins.

Mr. Bixby was born in Adrian, Mich., January 2, 1857, the son of Mr. and Mrs. Alonzo Foster Bixby. He attended the public schools and was graduated from the Adrian high school. After leaving school, Mr. Bixby entered the railway service and became general baggage agent of the International & Great Northern in 1880, a position which he held for a number of years. In June, 1881, he was married to Miss Lillian Tuttle at San Antonia, Tex.

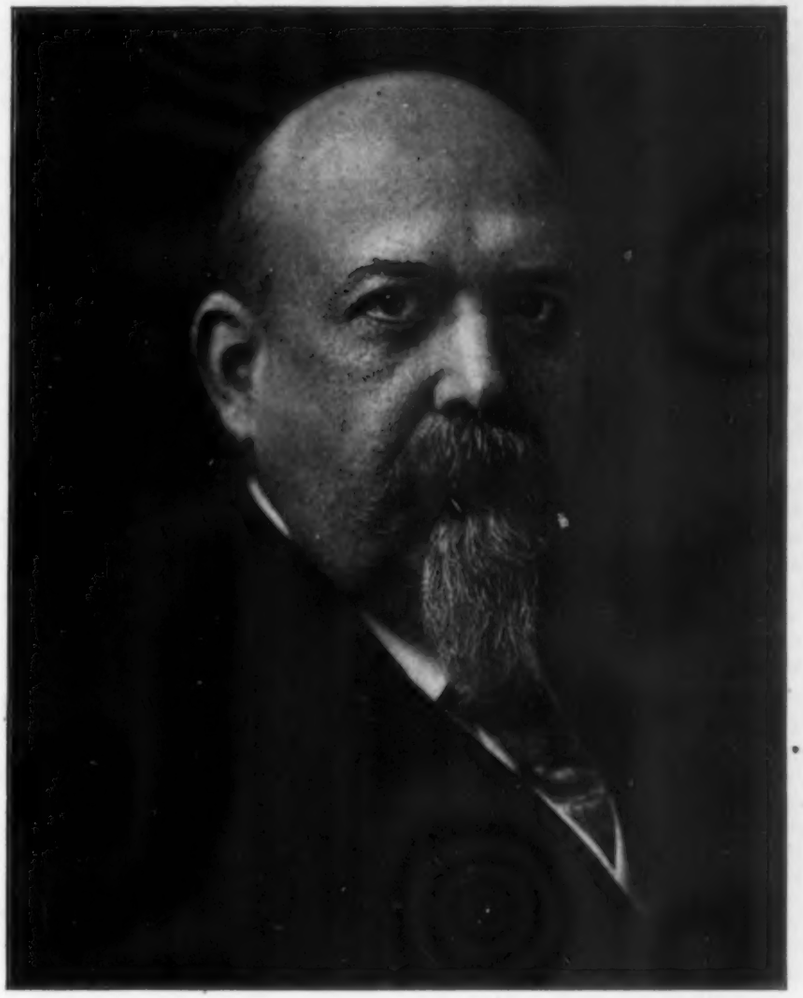
Leaving the railway service, Mr. Bixby became identified with the Missouri Car Co., of which he was the president at the time of the consolidation of the chief car works of the country. The St. Louis concern being in control of the merger, Mr. Bixby was chosen chairman of the new directorate, the position which has just been abolished. The duties of the chief executive will now fall upon the shoulders of Mr. F. H. Eaton, who was re-elected president.

Besides the American Car & Foundry Co., Mr. Bixby is identified with many other enterprises. He is a director of the Missouri Pacific railway, the St. Louis and San Francisco railway, the Boatman's Bank of St. Louis, the State Savings Bank of Detroit, and the St. Louis Union Trust Co., also being a member of the executive committee of the latter.

As a public spirited citizen there is none more useful or who devotes more of his time to public service than does William K. Bixby. Independent in politics, he is always associated with the forces of clean government, though not actively engaged in political campaigns. At the present time, he is devoting much of his time and attention to the new public library which is to be built in St. Louis, he being a member of the board of directors. Mr. Bixby is also a member of the board of the St. Louis Academy of Science, the Bibliophile Society of Boston, the Missouri Historical Society, Washington university, the St. Louis Manual Training School and the St. Louis Museum of Fine Arts.

Combined with his business ability Mr. Bixby has a keen eye for the beautiful. There is probably no better known art commissioner in the west and his own private collection, which he maintains in his palatial home on Lindell boulevard, will rank with almost any in America. As a bibliophile of recognition, Mr. Bixby has gathered a collection of old books, first editions, rare treatises and original manuscripts which has no equal west of the Mississippi. And Mr. Bixby does not wish to enjoy these alone. Anyone who wishes may view these paintings or inspect this library simply for the asking.

Though belonging to all the exclusive clubs of the city, and associating daily with men of millions, Mr. Bixby is as democratic as one of his station could well be. There is no form about the American Car & Foundry Co.' offices when he is there and a drayman can get by the clerk at the door as easily as the president of a railroad.



W. K. BIXBY. *Portrait by Strauss.*

Furnace C, of the Colorado Fuel & Iron Co., Bessemer, Col., has been blown out for repairs, and furnace A, which has been closed for some time, is again in blast. The great canal, which has been under construction for this company for some time, has been completed with the exception of eight miles of excavation and the laying of considerable concrete.

THE SERIOUS LABOR PROBLEM OF THE SOUTH.

The scarcity of labor in the south has reached a state so acute that efforts are being made in all lines of industry to secure some prompt and adequate relief. So far as iron and steel making is concerned, the need is chiefly for unskilled labor. A recent paragraph in a Birmingham paper said: "The scarcity of labor caused the Southern Steel Co. to close down its plants for several days this week" and similar statements are familiar reading in that district. "It is in fact," says the president of one of Alabama's leading iron companies, "that the output of our furnaces and mines and the production of cotton in the south are and will be limited for a considerable time for lack of adequate labor."

A number of factors have contributed to the bringing about of present conditions. The mills and factories and furnaces of the south are enjoying unparalleled prosperity, which has greatly increased their need of both skilled and unskilled workmen in a comparatively short time. The sources heretofore drawn upon to supply the laboringmen have not kept pace with this advance. The farms have largely given up their quota and the supply in this direction is practically exhausted. The north and west are sharing in prosperity and can spare no workmen, even if they could be persuaded to locate in the south. On the other hand, there is a constant drain upon that suffering section for negroes for northern service. The only other apparent avenue of relief is the bringing in of foreigners and, while this is perhaps the most promising solution of the problem, results so far achieved have been disappointing.

The southern laborer, particularly the negro, is unable to stand prosperity. Wages have advanced heavily in the past few years, but his standard of living remains unchanged. Three days' work will earn him as much as five or six a half decade ago, and to him this is ample reason for idleness half the time. This feature is emphasized by the heads of three representative iron and steel concerns in the south in statements prepared for THE IRON TRADE REVIEW.

President Maben's Views.

President J. C. Maben, of the Sloss-Sheffield Steel & Iron Co., Birmingham, has the following to say:

"It cannot be denied that the entire south is very short of labor, and that unless something is done to relieve the situation, the agricultural as well as the industrial development must be seriously retarded and much of the advance which this section has made during the last comparatively few years must be lost. The acreage under cultivation is curtailed each year by the inability of the planter to secure laborers, not only to cultivate the ground, but to pick the cotton crop after it is made, and the building of railroads is checked by the inability to secure hands and by the high wages demanded.

"There would seem to be a sufficient number of men to operate the coal and ore mines and run the furnaces, but they are, as a general thing, an improvident shiftless set, not caring to accumulate anything, and living from hand to mouth. The high wages that they are receiving enables them to live by working half the time, thus requiring double the number of men to do the same work as formerly. The competition among the companies for laborers, and the constant advance in wages, in order to draw them from each other, has completely demoralized the labor of this district, and is adding materially to the cost of production, not only of iron, but of coal, and consequently, of coke.

"The labor situation in this district could not be worse. Indeed, it is so bad that it gives ground for hope that some remedy will be applied. If wages could be reduced to normal rates, it would tend somewhat to correct the evils from which we are suffering, but this can hardly be hoped for during the present prosperous times, except by an agreement among the principal employers of labor, and this would probably be assailed as illegal, although the unions, whose avowed purpose is to advance wages, are not only tolerated, but encouraged by our legislators.

"It would seem, therefore, that we must suffer and endure the present deplorable conditions until a sufficient number of thrifty, foreign emigrants, who desire to accumulate something and will work steadily, can be brought in and put to work, thus displacing the shiftless negroes, until they begin to realize that they must work or be driven out. This, in my judgment, is the only salvation for this section and for the negro himself, but this takes time. Unless something is done to relieve the labor situation, the development of the south in the future must be comparatively slow, and yet we find southern members of congress advocating the most unreasonable restraint to this very immigration which is so badly needed in the south."

As President Bush Sees It.

President T. G. Bush, of the Alabama Consolidated Coal & Iron Co., Birmingham, says:

"In this district there is a great scarcity of labor of all classes, due to causes which are obvious to those who have taken the trouble to study the situation. To the present time all employers of labor have practically relied upon local laborers. That is to say, manufacturers of the south have not drawn labor to any extent from other sections of the country. The increased demand, as industrial plants have multiplied, has gradually reduced the supply. At the same time the farming interests have gradually had their supply of labor reduced as the mines and manufacturing plants have drawn from them. This process has gone on until the increased demand has made the labor situation acute and embarrassing.

"This condition has been accentuated from the fact that a large class of labor in this section seems ambitious only to earn a given amount per week or per month, and therefore works only a sufficient number of days to earn the required amount. Increased wages very naturally has lessened the number of days worked, and, therefore, we are suffering both from an actual shortage and from the comparatively short number of days in which many employes avail themselves of opportunity to earn wages.

"These conditions have caused many to look in other directions for a supply of labor and efforts are now being made to obtain at least a share of the foreign laborers monthly coming to this country. But little success has been attained so far in efforts of that kind, as the steady stream of immigrants to the middle west and far western states has continued for so many years that the trend is still in that direction.

"It seems to be a fact that this western supply has not yet been met, and every influence is being used to prevent any of these immigrants coming south. In many cases misrepresentations are made to influence laborers from coming in this direction. I am reliably informed that probably nine-tenths of the immigrants who land at Ellis island are ticketed to through points, showing that these people have had opportunities in foreign countries to arrange their plans for their destination.

"The need of the south as to labor is urgent, if not imperative, and organized effort will have to be made to secure an adequate supply. This not only applies to manufacturers of every kind, but to the farmers. I believe that the south could absorb probably several hundred thousand foreign immigrants per year for the next ten years.

"It is a fact that the output of our furnaces and mines and production of cotton in the south is and will be limited for a considerable time for lack of adequate labor."

Worst Condition in Years.

Joel Hurt, president of the Georgia Iron & Coal Co., Atlanta, writes as follows:

"I can state without hesitancy, from an experience of over thirty years in conducting business enterprises in which the labor question was an important factor, that there has never been a time in the south during this period when the supply of labor for any kind of an enterprise was in any manner so unsatisfcatory as it is now.

"The rate of wages ranges from 75 per cent to 100 per cent advance on the wages which were prevailing seven years ago. This is not the worst trouble which manufacturers and builders who employ negro labor have to contend with. On account of the increased rate of wages the negro is receiving, he only needs to work from one-half to two-thirds of his time in order to live as comfortably as he did several years ago. Consequently, many of this class are idle a good part of the time. One of the causes of the scarcity in labor is that a large number of negroes have been exported from southern states to northern and western states, on account of strikes which have occurred there.

"The situation in the south may be stated in substance as follows: The chief reliance for the cheaper class of labor is on the negro. We have but little white immigration, hence must depend for increased supply upon the increase of the negro population; as the negroes are being transferred to other parts of the union, this is a draft upon the supply of labor in the south, which is not compensated for by immigration of whites. The consequence is that many industries are almost at the mercy of unreliable negro labor.

"This problem is peculiar to the south only insofar as it applies to the negroes. The price of labor has advanced throughout the whole country to such an extent as to demand high prices for all commodities which are produced by labor. If the present labor conditions continue, it is inevitable that the prices of the products of labor must advance correspondingly."

From all sections of the south comes the same story of the deterioration of negro labor and its supplanting by immigrants. A recent issue of the Gadsden (Ala.) Times contained the following:

"The Alabama Consolidated Coal & Iron Co. is another of the iron manufacturing companies in this district that is supplanting negro with foreign white labor, and while a great many of the foreigers have not yet been brought to Gadsden by reason of the company's carefulness in making selections, those that are here are proving satisfactory. Some Poles and Germans have already been put to work at the local furnaces, and it is said that their work is satisfactory. It is understood that the company is selecting the best element of these foreigners. A number of Italians and Mexicans are being tried in the mines at Crudup and Attalla, and the Southern Steel Co. is trying Poles at the steel works. Negro labor has become so worthless in this district that it will of necessity be supplanted by foreign immigrants."

In this connection, Rev. J. R. McMullen, secretary of the Gadsden Commercial club and of the Alabama Trade School for White Boys, writes as follows:

"The Southern Steel Co. is bringing immigrants, as far as it is able to secure them, from New York. The great industrial activity has created an unusual demand for labor. The negro is unable to stand prosperity. He now finds himself able to make in three days the same amount of money which it formerly took a week to earn. After he has adapted himself to certain conditions, when he has received enough money to meet those conditions, he stops work."

The movement to divert a part of the great stream of immigration to the south has already assumed large proportions. A conference of the Southern States Immigration Commission was recently held in New York with the result that a bureau was established in that city to make clear to incoming foreigners the inducements of the south. The plan was also considered of starting a crusade for such an amendment of immigration laws as would permit the bringing in of workmen under contract, provided that a copy of the contract be filed with governmental authorities at the port of entry showing the contract wage is not below the standard of the section for which the laborers are destined. Little success, however, is anticipated in this latter project as the opposition of labor unions is certain to develop against any relaxation of the immigration restrictions. A number of states separately maintain immigration departments with a view to working some relief within their own confines, and only a few days ago the Alabama Commercial Industrial Association petitioned the legislature of that state to establish such a department.

In an educational way something is being done, the Alabama Trade School for White Boys being one of the projects most recently launched. "A state campaign for the purpose of securing one hundred thousand dollars in popular subscription has commenced," writes the secretary, "and behind the movement stands the entire congressional delegation of Alabama, every state officer, the entire judiciary, all the newspapers and every man of influence in the state. Behind it stands the National Manufacturers' Association, the Citizens' Industrial Association of the United States, commercial bodies all over the country; and it is our purpose to make this a national affair. The reason that we are locating in the south is because the south is in a pioneer state industrially and labor unions, socialism and anarchy have as yet no foothold here."

CANADIAN ROOFING COMBINE.

(Special Correspondence.)

Toronto, Can., July 9.—Some startling revelations were made recently in the course of the civic investigation into the combine in metallic roofing. It was proved that an agreement existed among seven firms, who tendered for the roofing of the St. Lawrence market and other contracts, under which it was arranged that the successful bidder should divide his profits with the others, all the tenders being placed high enough to allow a large profit after the division. According to the arrangement the Metallic Roofing Co. secured the St. Lawrence market contract at $12,995, of which $2,205 was divided among the other contracting firms. In all including smaller contracts the amount of "rake off" thus far disclosed paid to roofing firms belonging to the combine was $3,350, the participants in the deal being reported as follows: Wheeler & Bain, $1,400; A. B. Ormsby, Ltd., $895; A. Mathews, $275; W. G. Hutson & Sons, $275; Douglas Bros., $275; Pedlar Co., $230. A prosecution will be set on foot.

OPEN HEARTH STEEL CASTINGS.—VII.

BY W. M. CARR.

Chemical Analyses and Physical Tests.

The appended methods of chemical analyses are the result of several years' experience and have proven to be accurate and reliable. In several instances, the methods may be considered as standard, and are in daily use in many leading establishments.

In the manufacture of basic steel castings, where it is highly important to know the extent of dephosphorization as quickly as possible in preliminary tests taken during the progress of a heat, a suitable centrifugal machine is necessary. The same can be purchased through any house dealing with chemical supplies.

Determination of Silicon in Steel.

Five times the factor weight (2.3510 grams) of the drillings are weighed off, placed into a 5¼-inch porcelain dish, and a watch glass placed concave side down. Thirty cc. of silicon mixture are added. The dish is heated until the solution is evaporated, and fumes of sulphuric acid are given off. After cooling, 45 cc. hydrochloric acid, (1 part hydrochloric, 2 parts water) are added. Heat until all is dissolved, except the separated silica. Filter, wash alternately with hot hydrochloric acid (1-1) and hot water, until free from iron and acid. Burn and weigh. One fifth the weight represents the silicon percentage. Time required, fifty minutes.

Determination of Phosphorus in Steel.

Two grams of the drillings are weighed off, placed into a 250 cc. Erlenmyer flask, and 35 cc. nitric acid (specific gravity 1.2 added. The flask is heated until the drillings are in solution, and no brown fumes are given off. Ten cc. of a five per cent solution of potassium permanganate are added, and heating continued until the solution is colored brown, when a few drops of saturated cane sugar solution are added. The solution is cleared, and after heating a few minutes the flask is removed from the heat, and cooled in water. Neutralize with concentrated ammonia, and acidify with concentrated nitric acid until the solution assumes an amber color. To this solution at a temperature of 70-80 degrees Cent., add 50 cc. of ammonium molybdate solution, and a few drops of ammonia to hasten the precipitation. Shake well, and allow to settle in a warm place for ten minutes. Filter, wash with cold water until free from acid. Remove paper to original flask, add from 3 to 5 cc. or more if necessary, of potassium hydroxide solution. Add a few drops of a one per cent alcoholic solution of phenolphthalein. Shake thoroughly, allow to stand for five minutes, and titrate excess of alkali with nitric acid solution. The number of cubic centimeters of potassium hydroxide solution, neutralized by the phosphomolybdates represents hundredths per cent of phosphorus in the drillings. Time required, forty minutes.

Determination of Manganese in Steel.

One tenth gram of the drillings is weighed off and placed into a test tube (1 x 8 inches), and 15 cc. nitric acid (specific gravity 1.2) are added. The test tube is heated over a sand bath until the drillings are in solution, and the nitrous oxide fumes are expelled. About 0.7 grams lead peroxide (PbO_2) is added to the test tube taken from the sand bath, after which it is replaced and heated for one minute, then filled two-thirds with hot water. Boil a few minutes and settle by means of a centrifugal machine. Pour the clear solution into a flask, and titrate with sodium arsenite solution. The number of cubic centimeters of arsenite solution required, represents tenths per cent of manganese in drillings.

Time required, twenty-five minutes.

Determination of Sulphur in Steel.

Fifty times the factor weight (6.88 grams) are weighed off, and placed into a 500 cc. Elenmyer flask. The delivery tube is attached leading into a 100 cc. Erlenmyer flask, which contains 10 cc. hydrogen peroxide, 10 cc. concentrated ammonia, and 20 cc. water. Eighty cubic centimeters of hot hydrochloric acid (1-1) are added, and heat applied. When solution is complete, disconnect the apparatus, make the solution slightly acid with hydrochloric acid, bring to a boil, and add 10 cc. of a ten per cent solution of hot barium chloride. Boil five minutes, filter, using ashless pulp, burn and weigh barium sulphate, and make correction for sulphur in hydrogen peroxide. The weight of barium sulphate, divided by 50, represents thousandths per cent sulphur. Time required, fifty minutes.

Determination of Carbon in Steel.

Weigh 0.3 grams of drillings, and 0.3 grams of standard into separate test tube. Add 5 cc. nitric acid (specific gravity 1.2). Heat in a water bath until solution is complete. Cool in water and compare. Time required, thirty minutes.

Determination of Silicon in Pig Iron.

One gram of the sample is washed off into a 3¼-inch casserole, and a watch glass placed concave side down. A few drops of concentrated hydrochloric are added, then fifteen cubic centimeters of silicon mixture. The casserole is heated until sulphuric acid fumes are given off. After cooling, add 30 cc. hydrochloric acid (1.2), and boil until all is dissolved except the carbon and silica. Filter, wash alternately with hot hydrochloric acid (1-1), and add hot water until free from iron and acid; burn and weigh. If high in silicon, treat with hydrofluoric acid. The weight multiplied by 0.47 represents the per cent of silicon. Time required, one hour.

Determination of Phosphorus in Pig Iron.

From high phosphorus pig weigh off 0.2 gram and from low phosphorus pig as much as is best suited for the determination. To the 0.2 gram add 25 cubic centimeters of nitric acid (specific gravity 1.13). Boil until the drillings are in solution, adding more acid if necessary. Filter off graphite, add potassium permanganate, and proceed as in the determination of phosphorus in steel. Time required, fifty minutes.

Determination of Manganese in Pig Iron.

Proceed as in the determination of manganese in steel.

Determination of Sulphur in Pig Iron.

Five grams of the drillings are weighed off into a 500 cc. Erlenmyer flask, and a delivery tube connected which leads into a glass containing 10 cc. cadmium chloride solution, and 50 cc. water; 70 cc. hot hydrochloric acid (1-1) are added through the thistle tube, and heat is applied until the drillings are in solution, and steam has driven off all other gases. Disconnect, add a few cubic centimeters of starch solution, 40 cc. hydrochloric acid (1-1), and titrate immediately with iodine solution. The number of cubic centimeters of iodine solution represents hundredths per cent sulphur. Time required, thirty-five minutes.

Preliminary Tests.

Carbon:—Weigh off 0.2 gram of the drillings, and 0.2 gram of the standard into separate test tubes. Heat until solution is complete and compare colors. Time required: Four minutes.

Manganese:—Proceed as in the final test. Do not boil after adding water. Time required, six minutes.

Phosphorus: — One and one-half grams of the steel are weighed off into a 300 cc. Erlenmyer flask, and 35 cc. nitric acid (specific gravity 1.2) are added. When violent action ceases, place flask on heat, boil until drillings are in solution and no brown fumes

are given off. For every eight points carbon, add one cubic centimeter concentrated solution of chromic acid. Boil one minute. Transfer to a graduated bulb containing 50 cc. molybdic acid solution, shake violently, and allow to settle in centrifugal machine. Each small division on bulb represents hundrdeths per cent phosphorus. Time required, five minutes.

Solutions.

Silicon Mixture:

Water .....1,300 cubic centimeters
Nitric acid ..... 435 cubic centimeters
Sulphuric acid ..... 275 cubic centimeters

Add sulphuric acid slowly.

Standard acid and alkali for phosphorus determination:

1 per cent solution potassium hydroxide.
1 per cent solution nitric acid.
100 milligrams oxalic acid crystals equals 10 cc. potassium hydroxide.

Standardize with steel of known phosphorus contents.

Molybdate Solution:

Molybdic acid.....250 grams
Ammonia .....1,000 cubic centimeters

To use, 90 cc. stock solution in 338 cc. Nitric acid 1.20 specific gravity.

Keep acid cool, and stir while adding molybdic acid.

Sodium Arsenite Solution:

Stock solution.

Sodium Carbonate .....15 grams
Arsenous oxide ..... 5 grams
Water .....500 cubic centimeters

Boil and filter.

To use take 68 cc. stock solution to 2,000 cc. water, standardize against steel of known manganese contents.

Cadmium Chloride Solution:

Cadmium chloride .....35 grams
Water ..... 1,200 cubic centimeters
Ammonia ..... 800 cubic centimeters

Iodine Solution:

Iodine .....9 grams
Potassium iodide.....18 grams

Dissolve in a few cc. of water and dilute to two liters. Standarize against American Foundrymen's Association pig iron standards.

Starch Solution:

Mix a tablespoon full of starch with a little cold water, and pour into 100 cc. of boiling water, and continue the boiling for some time. Shake before using.

Nitric Acid, Specific Gravity, 1.2.

Nitric acid.....1,250 cc.
Water.....185 cc.

Nitric Acid, Specific Gravity, 1.13.

Nitric acid.....645 cc.
Water.....1,800 cc.

Physical Tests.

The specifications prepared by the American Society for Testing Materials, are quite generally recognized as being fair to both producer and customer. An objection to be raised is the costly style of the test bars recommended (Fig. 1).

When a large number of tests are to be made in the machine, cutting the threads, greatly increases the cost. When no specifications for physical tests are imposed, the type of the bar shown in Fig. 2, will answer for works tests, solely as a guide to the quality of product, and where the customer does not insist upon the test-bar with the threaded ends as illustrated.

The specifications, mainly, are drawn to cover the physical properties and they alone should be considered for the reason that there is no distinct

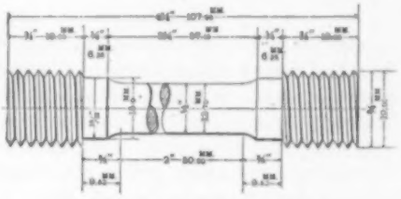


FIG. 1.—STANDARD TEST BAR.

relation between the chemical composition and the physical behavior.

The method of the treatment of castings is the prime consideration, and with a given chemical composition, it is possible to get a wide variation in physical tests with different heat treatments. From the standpoint of the manufacturer, specifications should only be applied to physical tests, leaving to him the adjustments of the processes of manufacture to harmonize with the expected physical requirements.

Test bars can only at best, show the condition their metal may be in, both in regard to the composition and the treatment to which they may have been subjected.

It would not follow that, because, a test-bar representing a given heat of steel, gives poor results in tensile or

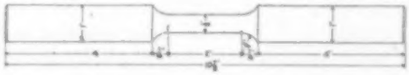


FIG. 2.—TEST BAR FOR WORKS TEST.

bending stress the entire heat was poor also in that. A test-bar can only show what might be expected of a finished casting of equal composition if it were to receive the same treatment as did the bar.

Tensile and bending tests serve useful purposes, but still leave something lacking. If a test bar under such stress gives excellent results or if a finished casting be subjected to the drop test, and possibly bends without fracture, proving great ductility, the evidence is not necessarily a positive guide as to life in service. Quite generally a steel casting is set up in service in such a manner that it may be constantly under alternating stresses or rapid and repeated shocks. Practical results from service data do not confirm the theory that ductile steel should resist such strains. Failures under such stresses frequently fall short of explanation in the light of recognized tests projected to prevent such failures. There then arises another want to be filled, a gap vacant because chemical analyses, physical tests and microscopical examinations do not enable the metallurgist to throw around the fruit of his labors the fullest possible precautions intended within the scope of such tests. Possibly fuller information is to be found by supplementing already established tests with other tests to approach as near as possible the conditions to which steel castings are subjected in service, namely—vibratory stresses. A study of such stresses will no doubt give much valuable information and change certain conditions now thought to be essential.

Relation Between Composition and Physical Properties.

(1) *Carbon.*—In order to understand the matter under consideration it would be well to study the definition of steel. Principally it is a combination of iron and carbon, and certain other ingredients to be regarded further, without any sharply defined limits as to the amount of carbon alloy. On the basis of composition alone the lower amounts may equal those found in wrought iron, and going to the other extreme it is difficult to say where steel ends and cast iron or pig iron begins. The composition of wrought iron in regard to carbon may range from traces to such amounts as 0.07 per cent, yet the softer steels can be produced with as low a carbon as 0.07 per cent, but the physical condition may be quite different as compared with wrought iron. As the carbon increases until a point is reached at or about 2.5 per cent the combination is then regarded as cast iron, the latter being the crudest form from which by various processes of purification and decarbonization many kinds of steel are produced. The process of manufacturing wrought iron is also a purifying and decarbonizing one with an essential difference whereby, in a sense, the former is a product of a "dry" method, while steel with any range of carbon is the result of a "wet" one. In other words, the temperature of the puddling furnace in which wrought iron is made is not sufficiently high to maintain fusion or fluidity completely during the full interval of the progress in conversion and puri-

fication. The initial charge is composed mainly of pig iron with a total carbon of between 2½ and 4 per cent, which readily melts and because of certain active influences gradually loses its carbon but gains in plasticity because of temperature limitations and the type of furnace used, so that at the end of the operation there will be a mass of almost carbonless iron which can be divided into several bulky, spongy balls and worked into shapes. On the other hand, steel making is the result of a process conducted under temperature conditions wherein fusion or liquation is maintained from the time of melting cold stock until such time when decarbonization has proceeded to almost any desired extent, so that with a proper type of furnace and necessary thermal ranges it is possible to equal in composition the commoner analyses of wrought iron. Thus, it will be understood that the content of carbon in the lower ranges will not suffice to mark the division between iron and steel. Another difference presents itself in, perhaps, a mechanical way, that is, wrought iron may contain slag or cinder enveloping its fibres varying in quantity between 0.2-2.0 per cent and which will play an important part upon its physical properties. The presence of cinder is due to the sponge-like formation of plastic wrought iron in its last stage of manufacture enclosing slag or cinder. Steel being produced by liquation permitting a separation of the slag and liquid metal by gravity, the finished product will be practically free from mechanically contained cinder, thus securing a greater continuity or intimacy within itself and therefore more strength than wrought iron containing an equal amount of carbon.

The metallurgy of steel is based principally upon the influence of carbon which controls the familiar properties of strength, ductility, malleability, weldability and most of all, the property of being hardened and tempered. The presence of carbon in iron is purely accidental, due to the use of carbonaceous fuel as a source of heat in smelting iron ores. Had the primitive iron makers stumbled upon some other substance that had a similar power of separating iron from its earthy matters, we might today be working with steel, the most important and useful of all metals, founded upon another basal element. Nature, in her bounteousness, has given us coal in abundance. It seems the simplest fundamental fuel for smelting iron ores; but owing to the affinity that exists between carbon and iron for each other there results a product highly carbonized, yielding a metal limited in its capacity for strength and ductility.

Carbon is recognized as existing in iron or steel in several forms with a variety of subdivisions; generally it is regarded as two constitutional divisions, one as combined carbon and another as free or graphitic carbon, the former being a definite chemical compound of iron and carbon, expressed by the symbol Fe_3C, and the latter (graphite) nearly pure carbon. It is stated by authorities that iron can carry theoretically, about two per cent of combined carbon and still be regarded as high carbon steel. Should the carbon be carried beyond that point and if heated and cooled slowly the pure or free form of carbon would appear in a small degree and the alloy would then be on the borderland of cast iron. As is well known, wrought iron and the very softest steels are both malleable, ductile and weldable, but as the content of carbon increases, those properties gradually diminish and the skill to work them becomes of a higher order than that required in the softer or milder grades. Cast iron is practically unforgable or weldable merely because of the excess of carbon present either in the combined or free state. Then summarizing the general explanations, steel may be regarded as a matrix of iron in which is dissolved or alloyed varying amounts of combined carbon with an absence of it in the free or graphitic form; a freedom from slag or cinder, the product of a process of liquation or complete fusion throughout the operation of refining and conversion.

Cast steel is a substance distinguished from wrought iron in that during certain stages of manufacture it is sufficiently liquid to pour into such receptacles as metal or sand molds. The composition of the product may cover wide ranges. Wrought iron as already stated is worked up from plastic masses of partially or completely decarbonized cast iron. Open-hearth castings are the product of liquid steel with limited composition poured into molds composed chiefly of silica sand. The physical properties must conform to certain requirements of strength, toughness, ductility and soundness. The attainment of such objects is brought about by adjustments of chemical compositions during the process of refining the raw material and also by certain methods of heat treatment applied to the finished product. Steel castings are divided into three grades: "soft," "medium," and "hard." Standard specifications do not define the chemical composition of each grade but give attention mainly to the physical properties as cited in the preceding pages. Generally stated the following figures will cover the composition of each class of castings:

	Carbon.	Silicon.	Sulphur.	Phosphorus.	Manganese.
Soft	0.17-0.20	0.25-0.35	0.015-0.050	0.020-0.04	0.50-0.75
Medium	0.20-0.30	0.25-0.35	0.015-0.050	0.020-0.04	0.50-0.75
Hard	0.30-0.40	2	0.015-0.050	0.020-0.04	0.75-1.00

Tensile strength is understood as the resistance of a body to a stretching force steadily applied. And the force necessary to produce a rupture is expressed in pounds per square inch of section.

Ductility is that property which yields to a tensile stress and produces a permanent deformation or elongation with or without rupture. It is expressed in "percentage of elongation" and is measured between two pre-determined points. It may also be indicated by the contraction of area when a specimen is measured, before and after the feature, in cross section. Not only will a specimen increase in length under a certain stress but at one point it will decrease in area so that upon fracture there may be a distinct "necking" and the rate of increase in sectional area is expressed in "percentage of contraction," which together with the measured elongation can be regarded as indices of ductility.

Elasticity is the ability of a body to resist or yield to a tensile stress without a permanent deformation, or in other words assume its original dimensions when the stress is released.

Elastic-limit is that point where a permanent deformation under a load begins or where a specimen fails to assume its original length or sectional area when the load is released. This definition can also be applied to describe the arrival of a "permanent set." The determination of elastic limit is a delicate one and in engineering problems is very important, representing the practical value of a casting. In making calculations for service loads the elastic limit of the metal entering into castings is taken as a basis, not the tensile strength. For general purposes 50 per cent of the ultimate or tensile strength is taken as the value of the elastic limit. An increasing ratio between elastic limit and tensile strength is a prime object to reach in high grade products.

Hardness is understood as the property of a body to resist the static penetration of another harder body, or it may mean the ability to resist attrition caused by the movement of another harder body.

Unfortunately there are not known any precise data as to the influence of carbon in steel castings upon the tensile strength and ductility of the metal in them. The influence can only be stated in general terms in the light of practice. To get exact values would entail different researches; it would be necessary to have conditions fixed in order to study the influence of successive increments of the element. The furnace practice, casting temperatures and heat treatment would have to be constant in each case for strict comparisons. The contents of silicon, sulphur, phosphorus and manganese would have to be subject to definite control with only variations permissible in the carbon of each specimen before reliable information could be deducted. Experience has proven as a recognized fact that carbon is both a hardening and strength giving agent. Reference to the physical requirements of the three grades of castings and their corresponding chemical analyses will bear out the general assertion, but owing to other disturbing influences, more or less potent, the ranges of analyses are not concordant with the tensile strength and ductility for each class. That is, it is indefinite that a 0.17 to 0.20 carbon may show about 60,000 pounds per square inch, and a given elongation and contraction. As the carbon increases there are gains in strength but decreases in ductility in the remaining grades. Campbell in his admirable work on the "Manufacture and Properties of Structural Steel," gives formulas for the calculation of the physical properties on the basis of chemical composition and in a later treatise [1] revises them giving values for several elements common to steel, making a distinction between acid and basic practice. His figures apply to *rolled* material produced under fairly regular conditions, but it would seem inconsistent to apply the same formulas to steel castings manufactured under totally dissimilar methods. Kent [2] quotes Webster giving values of carbon in rolled stock in conjunction with three other elements: Sulphur, phosphorus and manganese as a constant of 800 pounds per square inch with each 0.01 per cent of that element with a base value of 34,750 pounds per square inch for carbonless wrought iron. Prof. H. M. Howe [3] shows that the hardening power increases with the carbon content and also roughly plots a curve giving a direct increase in strength varying with the carbon until a point is reached near 1.20 per cent when the strength or tenacity rapidly decreases with a further gain in carbon up to three per cent, where the strength then remains fairly constant up to 4.50 per cent of that element. The maximum strength at 1.20 per cent being about 140,000 pounds per square inch falling to about 25,000 pounds at three per cent and at 4.50 per cent to about 18,000 pounds. Campbell [4] assumes a base value of wrought iron as 38 to 39,000 pounds per square inch and constructs formulas for both acid and basic steel compositions with 0.01 per cent carbon giving 1,210 pounds per square inch for each point gained in the first named grade and 950 pounds per square inch for each point of carbon in the latter grade, but which, as already stated, apply only to rolled material. In steel castings the disturbing factors are so numerous that it seems impossible to formulate precise mathematical computations covering the physical properties, taking into account the composition and values of each element. The furnace practice is perhaps, the greatest factor entering into the equation and since no two heats are handled exactly alike in all particulars the problem becomes more and more abstruse. Character of stock, flame action, oreing, casting temperatures, recarbonizing and the methods of doing the same, rate of cooling in the sand, either in dry or green sand molds, all need consideration as do methods of heat treatment, leading one into a maze of speculation. General terms, therefore, cannot be avoided. Certain authorities have been cited and the reader is at liberty to form his own conclusions as to which can or may be followed in attempting to give a value to carbon and its influence upon open-hearth steel castings.

[1] Journal British Iron and Steel Institute, No. 2, 1904, pp. 21 to 62.
[2] Mechanical Engineers' Pocketbook, 1904, p. 389.
[3] Iron and Steel and Other Alloys, 1903, pp. 192 to 162.
[4] Manufacture and Properties of Structural Steel, 1896, p. 329.

Importations of Cryolite.—Considerable quantities of the mineral cryolite are imported from Greenland each year for use in the manufacture of sodium salts. The quantity of cryolite imported during the year 1905, according to the United States Geological Survey, was 1,600 long tons, valued at $22,482 as against 959 tons, valued at $13,708, in 1904, and 7,708 tons, valued at $102,879, in 1903. In the processes of manufacture calcium fluoride results as a by-product, and is saved to be sold for use as a flux in open-hearth steel furnaces in the same manner and with the same results as the natural calcium fluoride, or fluor spar.

HEAVY ORE SHIPMENT

From the Mesabi. — Immense Future Capacity of Docks.

(Staff Correspondence.)

OFFICE OF *The Iron Trade Review*, Duluth, July 6.

The ore shipments for June were as follows: Duluth, Missabe & Northern, 1,640,263; Duluth & Iron Range, 1,165,207; Great Northern, 876,733 tons, making a total of 3,682,203 tons, bill of lading weights. For the season up to July 1 the Duluth, Missabe & Northern has shipped therefor 3,164,667 tons, the Duluth & Iron Range 2,564,753, the Great Northern 1,744,920, which makes the total from the north shore 7,474,340. The season is almost exactly one-third gone and the actual production so far under the most adverse conditions, if nothing more than maintained, will equal last year's output, so that the prediction of 25,000,000 tons for the Mesabi seems not at all improbable.

The Allouez ore docks at Superior, Wis., the ore shipping point for the Great Northern, will, it is expected, ship 6,000,000 tons this year in contrast to about 4,300,000 last year. This greater capacity results from the completion of the new No. 3 dock, the contract for the finishing of which was let last December. This dock, while parts of it have been in use since June 1, has just been finished. It is similar in size and capacity to the No. 2 dock, having 350 pockets, being 72 feet 8 inches high, 1,956 feet long and capable of holding 81,500 tons of ore. The present No. 1 dock is only 57 feet high and is so old that part of it can no longer be used. It has outlived its usefulness and in any case is too small for the present requirements of the ore trade, having only 250 pockets with a capacity of 40,500 tons. This dock is to be torn down at once and rebuilt. The work will not be delayed until the end of the ore season, for it is expected that much longer than the winter will be required for its completion, and that what may be lost in capacity this year will be more than regained with the new dock another year. The plans and specifications have been drawn up, the drawings nearly completed in detail and the lumber ordered. When finished the new No. 1 will have 340 pockets and a total capacity of 84,000 tons, which will mean that these docks in the future will be able to care for in the neighborhood of 11,000,000 tons a year.

About 70 per cent of the lumber required must come from the Pacific coast and when one realizes that 16,000,000 feet of lumber and 12,000, new piles will be needed, according to the specifications, the magnitude of the undertaking, which means an expenditure of between $6,000,000 and $7,000,000, becomes evident.

From five to six thousand piles 70 feet long and the remainder from 35 to 40 feet long will be necessary. In building the other docks the work was carried on from the land end outward so as to bring some of the inner pockets into service as soon as possible. In undertaking this building, however, the same plan as has been adopted at Missabe dock No. 4 will be pursued, that of working from both ends. As they now stand the Allouez docks handle on an average about 900 cars a day (20 hours), which means something less than 34,000 tons of ore. This quantity is restricted at present, however, by the shortage of cars rather than by the size and facilities of the docks.

The party of graduates in mining engineering from Lafayette college, at Easton, Pa., who through the courtesy of James Gayley, first vice president of the United States Steel Corporation, are to tour the ore ranges, arrived at Two Harbors on the Princeton, Saturday night. Sunday was spent in Duluth, and on Monday morning in charge of Prof. William S. Hall, head of the mining engineering department of Lafayette, and Prof. F. B. Peck, professor of geology, the party proceeded via the Duluth & Iron Range to Ely and Tower where they will first examine the Vermillion range formations and developments. From there the engineers to be will travel westward over the Mesabi, coming back to the shipping points to study the handling of the ore at the docks. After covering the north shore ranges the trip will be continued through the copper country and the old ranges. The fortunate men who are taking this trip are: M. C. Fairchild, H. T. Updegrove, G. O. Deschler, H. M. Hirst, F. W. Uhler, H. D. Kinsey, T. B. Silliman and W. O. Hauck.

Coal Output Increased.—The production of coal in Indiana during 1905, according to the United States Geological Survey, was 11,895,252 short tons, valued at $12,492,255. In Iowa 6,781,909 short tons, valued at $10,562,361 was mined. The production of Colorado was 8,826,429 short tons, with a spot value of $10,010,878. The Colorado output showed an increase of 32.5 per cent over that of 1904, plainly due to the growing iron industries in that state, and over a million tons of the increase was in the amount of coal made into coke. In Indiana 35.4 per cent of the total output was machine mined. In Iowa less than three per cent was machine mined.

The output of asbestos in the United States during 1905 was 3,109 short tons, valued at $42,975. This came chiefly from Georgia, Virginia and Massachusetts.

STEEL CASTINGS AND PIG IRON.

Some additional statistics compiled by the American Iron and Steel Association are herewith given. From these statistics we have compiled the accompanying table of steel castings. The production of steel in 1905 by various minor processes amounted to 8,963 tons, against 9,190 tons in 1904 and 9,804 tons in 1903. Five states made steel in 1905 by minor processes, namely, New Jersey, Pennsylvania, Indiana, Illinois, and Michigan. Blister, puddled, and "patented" steel, including patented steel castings, are included in these figures, and patented steel castings are given in the column headed "miscellaneous castings."

PRODUCTION OF STEEL CASTINGS.

States—Gross Tons.	Basic O. H. Castings.	Acid O. H. Castings.	Bessemer Castings.	Crucible Castings.	Misc. Castings.	Grand Total.
1905	206,159	320,381	22,103	5,733	6,391	560,767
1904	98,919	203,915	16,051	4,308	7,018	330,211
1903	134,879	265,469	18,099	5,409	6,409	430,265
1902	112,404	255,475	12,548	4,955	5,553	390,935
1901	94,941	206,681	6,764	3,927	5,257	317,570
1900	42,644	134,847	6,467	3,989	4,856	192,803
1899	39,689	130,040	3,939	3,500	3,944	181,112
1898	28,460	92,127	3,539	4,235	3,576	131,937

Production of Pig Iron by Grades.

The accompanying table gives the total production of pig iron in 1901, 1902, 1903, 1904 and 1905 by grades. Prior to 1900 the production of all grades was not ascertained. In that year the production of Bessemer and low-phosphorus pig iron amounted to 7,979,327 tons; basic pig iron made with mineral fuel only, 1,072,376 tons; forge pig iron, 793,092 tons; foundry and high silicon pig iron, 3,376,445 tons; malleable Bessemer pig iron, 173,413 tons; white and mottled and miscellaneous grades of pig iron, 129,909 tons; spiegeleisen, 207,505 tons; ferro-manganese, 48,472 tons; and direct castings, 8,703 tons; total, 13,789,242 tons.

PIG IRON PRODUCTION BY GRADES.

Grades—gross tons.	1901.	1902.	1903.	1904.	1905.
Bessemer and low-phosphorus	9,596,793	10,393,168	9,989,908	9,098,659	12,407,116
Basic (mineral fuel)	1,448,850	2,038,590	2,040,726	2,483,104	4,105,179
Forge pig iron	639,454	833,093	783,016	550,836	727,817
Foundry and high silicon	3,548,718	3,851,276	4,409,023	3,827,229	4,755,288
Malleable Bessemer	256,532	311,458	473,781	263,529	635,236
Spiegeleisen	231,822	168,408	156,700	162,370	227,797
Ferro-manganese	59,639	44,573	35,961	58,022	66,179
White, mottled, etc.	87,964	172,085	120,137	53,284	67,768
Direct castings	8,582	8,656			
Total	15,878,354	17,821,307	18,009,252	16,497,033	22,992,380

Building and Rebuilding Furnaces.

On Dec. 31, 1905, there were 17 furnaces in course of erection and three furnaces were being rebuilt. Of the building furnaces one coke furnace and one anthracite coal and coke furnace were in New York, two coke and two anthracite coal and coke furnaces were in Pennsylvania, one coke furnace was in Tennessee, two coke furnaces were in Alabama, three coke furnaces were in Ohio, two coke furnaces were in Illinois, one charcoal furnace was in Michigan, one coke furnace was in Wisconsin, and one coke furnace was in Colorado. Of the three rebuilding furnaces, all coke, one was in Pennsylvania, one was in Kentucky, and one was in Ohio.

Limestone Consumed in Making Pig Iron.

The limestone consumed for fluxing purposes by the blast furnaces in the production of 22,992,380 tons of pig iron in 1905 amounted to 11,627,438 tons. The average consumption of limestone per ton of all kinds of pig iron produced was 1,132.7 pounds in 1905, against 1,112.6 pounds in 1904. The consumption in 1905 by the anthracite and bituminous furnaces was 1,144.1 pounds, against 1,128 pounds in 1904, and by the charcoal furnaces it was 395.3 pounds in 1905, against 373.6 pounds in 1904.

WORLD'S COAL SUPPLY.

Statistics as to the amount of coal in the world or in any particular country are of small value because estimates are based on inadequate information. The German periodical, *Stahl und Eisen*, gives figures as to Germany's supply, which it places at 280,000,000,000 tons, which will last, at the present rate of consumption, a couple of thousand years. The coal deposits of Great Britain and Ireland are placed at 193,000,000,000 tons, with an annual consumption of twice that of Germany. The estimated coal deposit of Belgium is 23,000,000,000 tons; of France, 19,000,000,000 tons; Austria, 17,000,000,000, and Russia, 40,000,000,000 tons. North America's coal deposits are estimated by the same authority as 681,000,000,000 tons. The total for all Europe is placed at 700,000,000,000 tons. Asia is conceded to have much larger deposits, which can not even approximately be estimated.

Robert Job, for a number of years chemist for the Reading Railway Co., at Reading, Pa., has resigned to become a member of the firm of Booth, Garrett & Blair of Philadelphia. The officials and attaches of the testing department recently presented him a handsome loving cup.

Stocks Set New Average Low Level.

In a feverish market which fluctuated suddenly with little apparent reason, stocks declined during the past week at the lowest average level of the year. The movement of liquidation by large speculative pools, which began the week previous, continued without abatement, either from the idea that the public would not buy stocks at the high level recently reached or because advanced money rates made the burden too irksome to carry further. Total dealings for the week on the New York Exchange were 3,948,200 shares. United States Steel with 577,600 shares was most active, other market leaders being Reading, Union Pacific, Amalgamated Copper and Pennsylvania. The market was extremely nervous and the movement of prices was more often contrary to natural influences than with them. This was emphasized by the course of a number of iron and steel stocks, which, in spite of numerous evidences of prosperity in the industry, declined to the lowest point of the year. Tennessee Coal & Iron netted a loss of seven points during the week, and the Bethlehem Steel preferred also declined. The corporation issues, which started on Monday exceedingly weak, later rallied and the preferred closed above par. Colorado Fuel & Iron Co. showed the greatest strength in this line, with a net advance of 4¼ points on active dealing. Bond dealers are still despondent over the outlook for business, as conditions hitherto prevailing have changed but little. Specifications covering the first six months of the year show new stock issues of $225,000,000 and new bond issues of $622,000,000, a total of $847,000,000. The full extent of this unprecedented flotation movement can be understood from the fact that during the entire 12 months, ending with Dec. 31, 1905, the stock and bond output was $869,000,000, or only $42,000,000 more than during the past six months. Insurance companies and savings banks, usually heavy bond buyers, are almost out of the market, and little change for the better is expected until money rates decline, and the present real estate boom prevailing in many cities is punctured.

The Harbison & Walker Refractories Co. has declared the regular quarterly dividend of 1½ percent on preferred, payable July 20. None of the back dividend was paid.

Carrying out the reorganization plan recently authorized by its stockholders, the Barney & Smith Car Mfg. Co. has redeemed the entire issue of first mortgage 6 per cent bonds, the transaction requiring a cash outlay of $1,100,000. The old capital was $1,000,000 in 6 per cent bonds; $2,500,000 in 8 per cent preferred stock and $1,000,000 in common stock. The reorganization plan cancels the present issue and replaces it with $2,000,000 in 5 per cent bonds, and an additional issue of $1,000,000 of common stock. Part of the new common stock goes to the holders of preferred as payment of their deferred dividends, while a considerable sum realized from the sale of bonds will be used for improvements.

THE LEADING INDUSTRIAL SECURITIES.

	Closing Quo. June 30.	Closing Quotation July 7	Changes	Date of 1906 Ann. Meet.	Par Value	Capital Outstanding	Dividend Basis	Dividend Being Paid	Dividend Date Last Div. Dec.
Allis-Chalmers Co.	17¾	17⅛	− ⅝	Sept.	100	19,820,000		.....	.....
Allis-Chalmers preferred	54	45⅝	−8⅛		100	16,150,000	7 cum	.....	Feb., 1904
American Can	6½	6⅝	+ ⅛	Apr. 24	100	41,233,300		.....	.....
American Can preferred	54¾	55½	+ ¾		100	41,233,300	7 cum	5 Q.	July, 1906
American Car and Foundry	35⅝	36	+ ⅜	June 28	100	30,000,000		.....	May, 1905
AmericanCar and Foundry preferred	100	99⅛	− ⅜		100	30,000,000	7 n. c.	7 Q.	July, 1906
American Locomotive	65¾	67¾	+1½	Oct. 16	100	25,000,000		1¾	July, 1906
American Locomotive preferred	115	115	.....		100	24,100,000	7 cum	7 Q.	July, 1906
American Shipbuilding	64	62	−2	Oct. 2	100	7,600,000	4	4 Q.	Apr., 1906
American Shipbuilding preferred	106	106	.....		100	7,900,000	7 n. c.	7 Q.	Apr., 1906
American Steel Foundries	10	10½	+ ½	Oct. 3	100	17,700,000		.....	.....
American Steel Foundries preferred	41⅛	43⅛	+1⅞		100	17,700,000	6 cum	.....	Aug., 1905
Barney & Smith	65	65	.....	June 5	100	1,000,000		.....	June, 1894
Barney & Smith preferred	140	140	.....		100	2,500,000	8 cum	8 Q.	June 1906
Bethlehem Steel	25⅝	25	− ⅝	April 3	100	15,000,000		.....	.....
Bethlehem Steel preferred	88	86	−2		100	15,000,000	7 n. c.	7 Q.	May, 1906
Bullock Electric preferred	111	111	.....	Oct. 2	100	1,000,000	6	6 Q.	July, 1906
Cambria Steel	33¾	34¼	+ ½	March 20	50	45,000,000	8	7 Q.	Mar., 1906
Cambria Iron	49½	49¾	.....		50	8,468,000	4	4 S. A.	Apr., 1906
Colorado Fuel & Iron	45⅝	49⅝	+4¼	Oct. 15	100	30,132,000	7	.....	Apr., 1902
Wm. Cramp & Sons Ship & Eng. Bldg. Co.	18	18	.....	May 31	100	6,098,000	5	.....	Nov., 1902
Crucible Steel	10	10⅝	+ ⅝	Oct. 17	100	25,000,000		.....	.....
Crucible Steel preferred	75	75	.....		100	25,000,000	7 cum	.....	June, 1906
Empire Steel	5	4	−1	Feb. 28	100	2,281,400		.....	.....
Empire Steel preferred	35	35	.....		100	2,500,000	6 cum	3 S. A.	July, 1906
Fay & Egan	93½	93½	.....	Feb. 20	100	1,000,000	6	6 Q.	May, 1906
Fay & Egan preferred	128½	128½	.....		100	1,000,000	7 cum	7 Q.	May, 1906
General Electric	161¼	164	+2¾	May 8	100	48,256,050	8	8 Q.	July, 1906
International Pump	41	40	−4	June 5	100	12,262,500		2	July, 1905
International Pump preferred	82⅝	82⅝	+ ⅛		100	8,850,000	6 cum	6 Q.	May, 1906
Lackawanna Steel	71	71	.....	March 14	100	34,971,400		.....	.....
Lake Superior Corporation	17⅝	17	− ⅝	Oct. 3	100	40,000,000		.....	.....
Niles-Bement-Pond	130	130	.....	Feb. 7	100	5,000,000	6	6 Q.	May, 1906
Niles-Bement-Pond preferred	105	105	.....		100	2,000,000	6 cum	6 Q.	June, 1906
Otis Elevator Co.	48	48	.....	March 19	100	6,350,300		2 A.	Apr., 1906
Otis Elevator Co. preferred	98	98	.....		100	5,589,500	6 n. c.	6 Q.	July, 1906
Pittsburg Coal Co.	13⅛	13½	.....	Feb. 12	100	30,135,000		.....	.....
Pittsburg Coal preferred	51⅞	51¾	−⅛		100	30,716,200	7	.....	Apr., 1905
Pressed Steel Car	44½	46½	+2	Feb. 21	100	12,500,000		3	Aug., 1904
Pressed Steel Car preferred	96½	96½	.....		100	12,500,000	7 n. c.	7 Q.	May, 1906
Pullman Palace Car	220	219	−1	Oct. 18	100	74,000,000		8 Q.	May, 1906
Railway Steel Spring	48	49⅛	+1⅛	March 1	100	13,500,000		4 S. A.	Oct., 1905
Railway Steel Spring preferred	100¼	100	− ¼		100	13,500,000	7 cum	7 Q.	June, 1906
Republic Iron & Steel	25¾	26⅞	+1⅛	Oct. 17	100	27,352,000		.....	.....
Republic Iron & Steel preferred	94	96	+2		100	20,852,000	7 cum	7 Q.	Apr., 1906
Sloss-Sheffield	69	71	+2	March 14	100	7,500,000	5	5	Jan., 1906
Sloss-Sheffield preferred	107	106	−1		100	6,700,000	7 n. c.	7 Q.	July, 1906
Tennessee Coal & Iron	150	143	−7	May 15	100	22,552,800		4 Q.	Aug., 1906
U. S. Cast Iron Pipe & Foundry	47⅝	47	− ⅝	June 27	100	12,500,000		2	June, 1906
U. S. Cast Iron Pipe & Foundry preferred	91	91	.....		100	12,500,000	7 n. c.	7	June, 1906
U. S. Steel	34	35⅛	+1⅛	April 16	100	508,302,500		.....	Dec., 1903
U. S. Steel preferred	99¾	101⅝	+1⅞		100	360,281,100	7 cum	7 Q.	May, 1906
U. S. Steel 5's	96½	97	+ ½		100	463,798,000	5	5 A.	
Virginia Iron, Coal & Coke	40	41	+1	Sept. 18	100	8,641,600		.....	.....
Westinghouse Electric	154	151	−3	June 27	50	20,996,350	10	10 Q.	July, 1906
Westinghouse Air Brake	147	148	+1	Oct. 2	50	10,990,450	20	20 Q.	July, 1906

NEWS FROM MANY INDUSTRIES.

New Buyers:—

The American Automobile Co., Pittsburg, has been organized with a capitalization of $50,000 by L. C. Myers, M. S. Simms, S. A. Dickle, H. S. Stewart and George Eckle.

The Republic Spring & Mfg. Co., Pittsburg, has been incorporated with a capital of $30,000 by James D. Ayres, William J. McKee and John Pfeil.

The Westinghouse Consolidated Foundries Co., Pittsburg, has been organized with a capitalization of $5,000 by George C. Smith, W. T. Updegraff and E. D. Seifz.

The Benjamin Iron & Steel Co., Hazleton, Pa., has been incorporated with a capital of $5,000 by David Benjamin.

The Eberly & Orris Mfg. Co., Mechanicsburg, Pa., has been organized with a capitalization of $125,000 to manufacture wheels, etc. The incorporators are: Adam Orris, A. G. Eberly, J. C. Lambert, J. E. Williams and D. W. Sunday.

The Chicago Foundry Co., Chicago, Ill., has been organized with a capitalization of $20,000. It will make a specialty of duplicate gray iron castings, soil pipe and soil pipe fittings. The incorporators are: A. A. Burns, M. T. Ash, E. E. Mower and E. F. McKinney.

Julius Jonson's Sons has been incorporated with a capital stock of $10,000 to manufacture "raw iron." The incorporators are: Edwin H. Jonson, Julius Jonson, and Ida A. Jonson, all of 51 East 96th street, New York.

The National Smoke Consumer Co., chartered with a capital stock of $50,000, will manufacture devices for smoke consumption. The incorporators are: Merrill W. Matthews, 190 Maryland street; Frank Jerge, 575 Broadway and William M. Thornton, Trenton avenue, all of Buffalo, N. Y.

The A. Dewes Co. has been incorporated to manufacture machine dies, tools, engines, etc. The capital stock is $15,000 and the incorporators are: Abednego Dewes, 589 Macon street, Brooklyn; William L. Lyman, 35 North Seventh street; and John W. Dunn, 63 South street, Newark, N. J.

The Wachusett Machine Co. has been incorporated to carry on a general machinery business. The capital stock is $10,000, and the incorporators are: President George B. Warner, 70 Mt. Vernon avenue, Fitchburg, Mass.; treasurer, Frederick E. Farwell, Pleasant avenue, Leominster, Mass.; clerk, Ernest W. Gilson, 86 Mt. Vernon street, Fitchburg, Mass.

The Canadian McVicker Engine Co., Ltd., Galt, Ont., has been organized with a capitalization of $100,000 by John R. Golden, Charles L. Weisner, Thomas J. Lannen and Harry H. Tillinghaste.

The Oil Well Supply Co., Ltd., Petrolea, Ont., has been organized with a capitalization of $100,000 by James Joyce, John A. MacKenzie and Ernest A. Westland.

The Schofield, Holden Machine Co., Ltd., Toronto, Ont., has been organized with a capital stock of $40,000 by Richard Schofield, Arthur T. Holden and Marshall H. Anderson.

The Railway Supplies Co., Ltd., and the Canadian Rail Joint Co., Ltd., Toronto, Ont., have been incorporated with a capitalization of $250,000 each. They are supposed to represent the Mackenzie & Mann interests.

The Improved Shuttle Co. of Canada, Ltd., Montreal, Que., has been organized with a capitalization of $30,000 by H. D. Metcalfe, Charles P. Metcalfe, Charles N. Blakeley, William S. Hutchison and Frank S. Saunders.

Churchward Steel Corporation has been incorporated with a capital stock of $125,000, to manufacture steel, iron, etc. The incorporators are: Charles S. Dodge, 52 Broadway; William Beverly Winslow and Frank H. Waggoner, 253 Broadway, all of New York.

The Keokee Coal & Coke Co. has been chartered with a capital stock of $1,500,000 to operate mines, deal in coke, coal, etc. The incorporators are: Charles Page Perin, 771 Madison avenue; R. Stuyvesant Pierrepont, 216 Columbia Heights; and Willoughby L. Webb, 2 West 83rd street, all of New York.

The Standard Emery & Polishing Wheel Co., incorporated with a capital stock of $30,000, will manufacture and sell polishing wheels. The officers are: President, W. C. Van Alstyne, Long Meadow, Mass.; treasurer, W. T. Francis, Springfield, Mass.; clerk, W. C. Van Alstyne, Long Meadow, Mass.

Brooklyn Steel Metal Stamping Co. has been incorporated with a capital stock of $25,000 to manufacture stamped metals of all kinds. The incorporators are: Carsten Dinnsen, 103 Scholes street, Brooklyn; Alfred F. George, 100 William street; Felix Jellinek, 15 William street, New York.

The Willys-Crew Motor Co. has been incorporated with a capital stock of $5,000, to manufacture motors, engines, machinery, etc. The incorporators are: John S. Willys, Wesley O. Crew, and Guy W. Shoemaker, Elmira, N. Y.

The Brown-Davis Hardware Co., tool makers, machinists, founders, etc., has been incorporated with a capital stock of $100,000. The officers are: John W. Brown, 509 Main street, Worcester, Mass.; treasurer and clerk, F. Austin Wilson, 294 Washington street, Boston, Mass.

The Oneonta Mfg. Co., chartered with a capital stock of $22,000 will manufacture machinery and patented articles. The incorporators are: Squire B. Gardner, Marcus C. Hemstreet, Charles Gardner, all of Oneonta, N. Y.

The Tutwiler Coal & Coke Co., Ltd., New Orleans, La., has been incorporated with $20,000 capital stock to deal in coal, coke and iron. Alex. S. Tutwiler is president and treasurer, Willis J. Milner is vice president and Archie Hall, secretary.

The Shand Engineering Co., Columbia, S. C., has been incorporated with $10,000 capital stock by G. E. Shand, G. E. Lafaye and E. F. Lilly.

The Rex Coal & Coke Co., Logan, W. Va., has been incorporated for the development of extensive coal lands under lease. J. B. Neal is president and general manager, C. E. Kinzer, vice president and general superintendent, and W. R. Godfrey, secretary and treasurer, all of Rock, W. Va. John Hunter, located at Logan, W. Va., is chief engineer of construction.

The Anderson Engine Co., Shelbyville, Ill., has been incorporated with a capitalization of $30,000 by W. C. Anderson, L. L. Canine and Carl Anderson.

The Pioneer Cast Steel Truck Co., Chicago, Ill., has been organized with a capital of $100,000 by A. B. Cooke, Ira C. Hubbell and E. M. Hadley.

The Gray Iron Foundry Co., Chicago, Ill., has been incorporated with a capitalization of $10,000 by John B. Henderson, Robert L. Barry and Ralph E. Snoad.

The Pioneer Steel Co., Rockford, Ill., has been organized with a capital of $50,000 by T. A. Weyburn, W. A. Clark and S. Valentine Saxby.

The American Calk Co., Detroit, Mich., has been incorporated with a capitalization of $5,000 by T. Earl Long, 277 Field avenue; E. T. Gilbert, 83 Brainard avenue, and Charles M. Roehm, 545 Second avenue, Detroit.

The Ideal Foundry, Grand Rapids, Mich., has been organized with a capitalization of $10,000 by Charles H. Glaser, Theodore H. Weiland, James Vidro and John Tennis.

New Construction:—

The Shelbyville Foundry & Machine Works, Shelbyville, Ind., expects to erect a machine shop in the spring of 1907. Its present floor space is being added to considerably, and all present requirements in the equipment line have been covered. S. J. Myers is manager.

The Hicks Locomotive & Car Works, Chicago, is planning to erect a steel car repair and erecting shop at Chicago Heights, Ill., where the company is now located.

The new structural steel machine shop of the Titusville Forge Co., Titusville, Pa., has just been completed. The building is 80 x 180 feet, equipped with a 20-ton electric crane and a complete set of new machine tools, electrically driven. The plant will be in operation within a few days, manufacturing iron and steel forgings.

Blake & Johnson, Waterbury, Conn., have purchased a site of ten acres in Waterville, a suburb of Waterbury, for the purpose of adding to their works. Just what buildings will be erected have not yet been decided upon. The company at present operates two establishments which are inadequate to take care of its rapidly growing business.

The Victor Foundry & Mfg. Co., Hamilton, O., is to erect a brick structure 80 x 200 feet. The contract has been let to A. Williams, of Cincinnati.

The first of the new armories to be built by the state of Pennsylvania under a general appropriation for the purpose will be erected at Columbia. Bids for it will be received at Harrisburg by the state armory board on July 12.

Stockholders of the Eastern Steel Co. have voted to increase the funded indebtedness from $2,500,000 to $3,000,000 to provide for the building of a bridge shop and for other extensive improvements.

The Automatic Electric Co., Chicago, manufacturing the Strowger automatic switchboard, telephones and devices, has issued $1,000,000 new stock to provide for the enlargement of its plant. The contract for ten automatic screw machines has already been placed, and a large amount of other machinery will also be installed.

The Independent Stove Co., Detroit, Mich., which was incorporated only a short time ago, has begun operations in a structure 150 x 107 feet, the construction of which has just been completed. Steel ranges will be manufactured. Those interested in the company are: William Robinson, formerly with the Art Stove Co.; J. E. Ellis, now assistant purchasing agent for the Michigan Stove Co., and Robert Waddell, traveling salesman for the same concern.

The Hamilton Foundry & Machine Co., Hamilton, O., is making an extensive addition to its plant, practically doubling its capacity. The main addition is to be an "L" shaped building. The front part, 44 x 148 feet, will be used as a shipping room, snap flask room and pattern vault. All machinery will be electrically driven, and contracts for all the equipment have already been placed.

The Byron Jackson Machine Works, Oakland, Cal., manufacturing pumps, machinery, etc., has purchased a site of 28 acres on the water front and railroad in Berkeley, Cal., on which buildings are being erected. Nearly all of the machinery equipment has already been purchased, and the company expects to occupy the plant early in July.

The Harrisburg Foundry & Machine Works, Harrisburg, Pa., will erect an addition to its machine shop and office building.

The Chicago Malleable Castings Co., Chicago, Ill., has purchased 10½ acres of land adjoining its present plant. The company expects to erect a foundry during the coming fall or next spring.

The Payne & Joubert Co., now erecting a large foundry and machine shops at East Birmingham, Ala., has recently increased its capital stock from $100,000 to $150,000. The plant being erected will be one of the largest, if not the largest of the kind in the south. It will probably begin operations during the present month.

The J. R. Saylor Co. is building an addition to its foundry at Pottstown, Pa.

The Woodward Iron Co., Woodward, Ala., has begun the work of razing the old No. 2 iron stack to make way for a modern 300-ton stack which will be a duplicate of No. 3 completed last year.

Extensive improvements are being made at the furnaces of the Warwick Iron & Steel Co., Pottstown, Pa. A new blacksmith and machine shop 40 x 100 feet is being erected.

The Chattanooga Plow Co., Chattanooga, Tenn., will erect an addition to its foundry 80 x 128 feet.

The additions to the plant of the Empire Rolling Mill, Newburg, Cleveland, O., which have been under way for some time, have been completed, practically doubling the capacity of the works. The old plant has been closed down for the past few days for overhauling, in preparation for starting the entire plant.

According to current reports, Toledo, O., is to have a new plant for the manufacture of steel castings, to be known as the Toledo Steel Foundry Co. The capitalization, $250,000, it is stated, has been fully paid up, and an extensive plant, equipped with open-hearth furnaces, will be erected. Charles A. Parsons, of Toledo, is promoting the enterprise.

General Industrial Notes:—

The small furnace being built by the Lebanon Reduction Co. near the site of the old Donaughmore furnace in Lebanon county, Pa., is about completed and will be started this month. H. B. Weaver is manager.

The Buckeye Tool Co., Leetonia, O., has purchased a portion of the old plant of the Crescent Machine Co., and is fitting it up as a modern factory for the manufacture of mining tools. Operations will be begun about Aug. 1. C. G. Wilderson is president, W. G. Bess, secretary; Elmer Harrold, treasurer; and H. T. Collins, an experienced tool manufacturer, superintendent.

The Macungie furnace of the Empire Steel & Iron Co. at Macungie, Berks county, Pa., has been fired up preparatory to starting. It has been on the repair list for some time. One of the furnaces in the Reading district owned by the Reading Iron Co. will also start.

The steel and rail departments of the south works of the Illinois Steel Co. closed down June 30 for two weeks, while a number of necessary repairs are made.

The South Chester Tube Works, Chester, Pa., has put more of its plant into operation and the rest of it may start soon.

The Glasgow Iron Works, at Pottstown, Pa., has resumed in nearly all departments after a short suspension.

The Wilson Laundry Machinery Co., of Columbia, Pa., has decided to increase its capital to $15,000. A six per cent dividend has been declared.

The Harrisburg Rolling Mill, at Harrisburg, Pa., is now running all of its three mills and is making bar iron. Its business during June was extremely heavy.

Receiver Robert L. Cox, of the Western Wire Goods Co., Buffalo, announces that the affairs of the concern have been practically wound up and that creditors will get about 50 cents on the dollar on their claims.

The June output at the works of the Pennsylvania Steel Co. was a very large one in all departments. The

steel mills and rail mill will be run full time and for a few days the rail and blooming mills will be on repairs. The company has considerable fall work ahead. Its new open-hearth steel department is being rushed.

The plant of the Norway Iron & Steel Co., of York, Pa., containing an open-hearth steel furnace and rolling mill, has been bought by the Heaney Fireproof Wire Co. which will operate it. The Norway company had been conducted by local capital for several years. It is said that the purchase price was over $360,000.

Claire furnace of the Claire Furnace Co., at Sharpsville, Pa., went out of blast July 1 after a long and successful run. The stack will be relined and a number of minor improvements will be made to the stoves, the expectation being that the furnace will resume the latter part of August.

The Florence Iron Co., Florence, Wis., has taken formal possession of the properties heretofore owned by the Florence Iron River Co. Felix A. Vogel is general manager and a general office is maintained at room 404, 25 Broad street, New York.

At the annual meeting of the Antrim Iron Co., held recently at Grand Rapids, Mich., the retiring officers and directory board were re-elected as follows: T. J. O'Brien, president; W. Barnhart, vice president; J. C. Holt, secretary and treasurer; Harvey J. Hollister, W. Barnhart, Edward Lowe, William Judson, J. M. Barnett, T. J. O'Brien and J. C. Holt, directors.

The traffic report of the government canal at the Soo shows that June was a record breaker, the total tonnage handled being 7,025,235. In all 3,245 vessels passed through the canal during the month.

The work of relining Citico furnace, Chattanooga, is nearing completion and it will be blown in about the middle of July. Repairs at the Chattanooga furnace are also well under way, and it is ready to go into blast again.

The new rod mill of the Carpenter Steel Works, Reading, Pa., has resumed operations after an idleness of six weeks for repairs. The 16-inch mill has been put on eight-hour terms, and every department is rushed.

James P. Winchester and Howard T. Wallace, receivers of the Diamond State Steel Co., Wilmington, Del., have sent out notices to stockholders announcing the failure of the plan to dispose of the plant to the New York syndicate, and stating that an effort will be made on the part of bondholders, creditors and stockholders to effect a reorganization of the company.

Fires:—

The Puget Sound Iron & Steel Works, Tacoma, Wash., were damaged to the extent of $15,000 by fire, June 20. The loss was chiefly confined to the destruction of marine engine patterns.

The American Steel Foundries plant in East St. Louis, Ill., was damaged to the extent of $20,000 by fire, June 28.

The W. T. Adams Machine Works, Corinth, Miss., lost a portion of its plant by fire, July 4, the damage being estimated at $150,000.

The plant of the Dayton Pneumatic Tool Co., Dayton, Ohio, was visited by fire on the morning of July 2, when considerable damage was done to belting, line shafting and to a supply of office supplies stored in the back part of the plant. The fire was confined almost entirely to adjoining buildings, but it was found necessary to close down for a few days while repairs to the power plant were under way. These have now been completed and the company is operating all departments again with full force.

Trade Notes:—

The Shaw-Kendall Engineering Co., Toledo, O., has just taken possession of its new plant which doubles its capacity. This move was forced by the rapid growth of its business in the past year, and further extensions are contemplated. The company makes a specialty of contracting for power plants complete as well as for separate machinery and equipment.

The Boston offices of the Niles-Bement-Pond Co. and the Pratt & Whitney Co. have been removed from Pearl street to more commodious quarters on the eighth floor of the Oliver building, corner of Milk and Oliver streets. The policy of these companies is to dispense with show rooms, as the variety of both heavy and light machine tools and cranes built by their several works is too great to permit of exhibition.

The Toledo Machine & Tool Co., Toledo, O., designer and builder of machine tools, has recently secured an order from the United States government for a number of presses for navy yard use. An order has also been booked for a drop forging plant consisting of one 3,500-pound, two 2,500-pound, two 2,000-pound, two 1,500-pound and two 1,000-pound drop hammers and 11 trimmings ranging in weight from 8,000 to 27,000 pounds.

The Wellman-Seaver-Morgan Co., Cleveland, is installing an overhead bridge for conveying purposes, and making other improvements at the Glenwood plant of the National Tube Co.

The Foos Gas Engine Co., Springfield, O., which has been buying considerable machinery within the past year, has again placed an order for $20,000 worth of machine tools, consisting of lathes, planers, boring mills, drill presses, grinders, etc. The company has been building gas and gasoline engines since 1887, and as it is employing twice as many men as it did a few years ago, is finding its present equipment inadequate.

The Wellman-Seaver-Morgan Co., Cleveland, announces that its Pacific coast office has been moved from its temporary location in Oakland, and is now permanently located in the Atlas building, 604 Mission street, San Francisco.

BONUS TO OLD EMPLOYES.

The seventh half-yearly distribution of the bonus to the most efficient employes of over ten years' standing at the Remington typewriter factories took place on the Recreation Park of Wyckoff, Seamans & Benedict recently. The number participating on that occasion—262—was the largest since the scheme was instituted and $13,100 in gold was divided, giving $50 to each person. A similar distribution takes place every Christmas.

On the recent occasion the following were the periods of continuous employment represented: Three men over 33 years, six men over 25 years, thirty-four men over 20 years, ninety men over 15 years and one hundred and twenty-nine men over 10 years. A photograph of the bonus group was taken and the prizes and certificates for good suggestions adopted during the past six months were presented. The annual field day of the company was held in connection with the distribution and was attended by between 4,000 and 5,000 people. Prizes and medals were distributed to the winners. The entire event was arranged by John Calder, manager of the company, and the factory committee.

Ship Canal Charter.—The bill granting a federal charter to the Lake Erie & Ohio River Ship Canal has been finally agreed upon by both houses of congress, and has received the president's signature. The clauses stricken out were those requiring the legislative consent of Ohio and Pennsylvania to the enterprise and providing that the company suspend the payment of dividends whenever it establishes a sinking fund. A provision whereby the United States could purchase the canal after 50 years was eliminated.